

FREE

University of Alberta Library



0 1620 3681912 4



MATHEMATICS

MODULE 3



PATTERNS EVERYWHERE

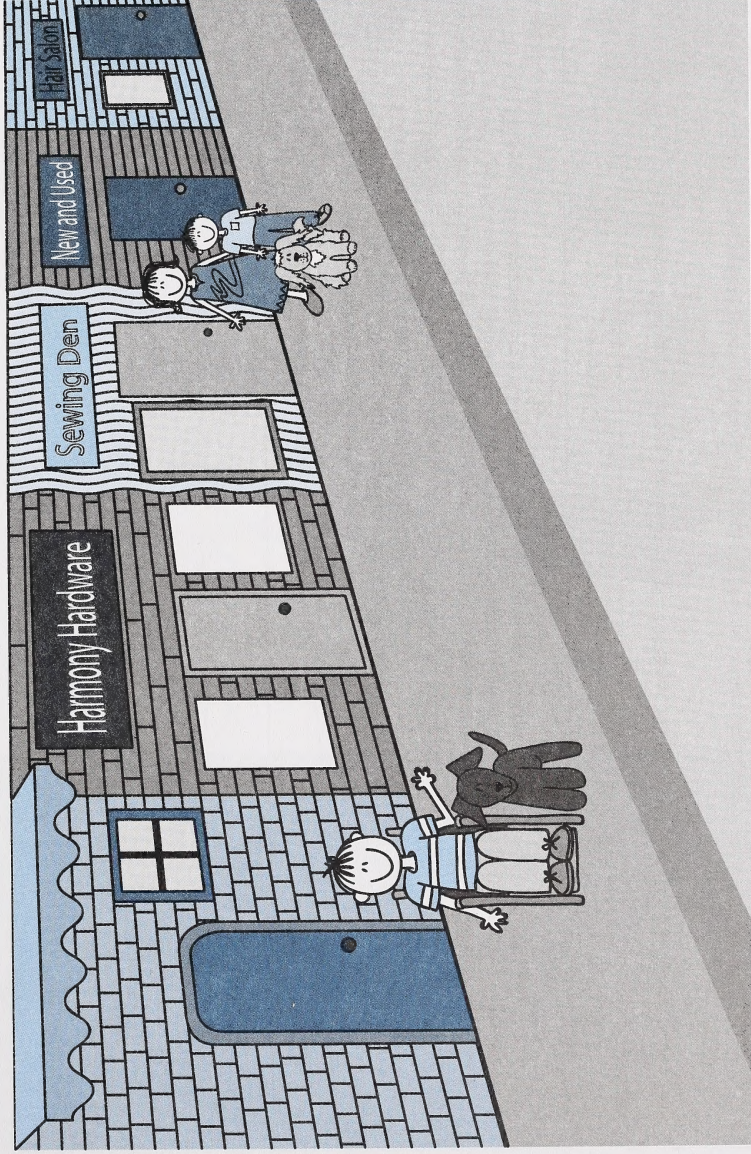


Learning
Technologies
Branch

Alberta
LEARNING

GRADE THREE MATHEMATICS: MODULE 3

PATTERNS EVERYWHERE



This document is intended for	
Students	✓
Teachers	✓
Administrators	
Home Instructors	✓
General Public	
Other	



You may find the following Internet sites useful:

- Alberta Learning, <http://www.learning.gov.ab.ca>
- Learning Technologies Branch, <http://www.learning.gov.ab.ca/lrb>
- Learning Resources Centre, <http://www.lrc.learning.gov.ab.ca>

The use of the Internet is optional. Exploring the electronic information superhighway can be educational and entertaining. However, be aware that these computer networks are not censored. Students may unintentionally or purposely find articles on the Internet that may be offensive or inappropriate. As well, the sources of information are not always cited and the content may not be accurate. Therefore, students may wish to confirm facts with a second source.

ALL RIGHTS RESERVED

Copyright © 2002, the Crown in Right of Alberta, as represented by the Minister of Learning, Alberta Learning, 10155 – 102 Street, Edmonton, Alberta T5J 4L5. All rights reserved. Additional copies may be obtained from the Learning Resources Centre.

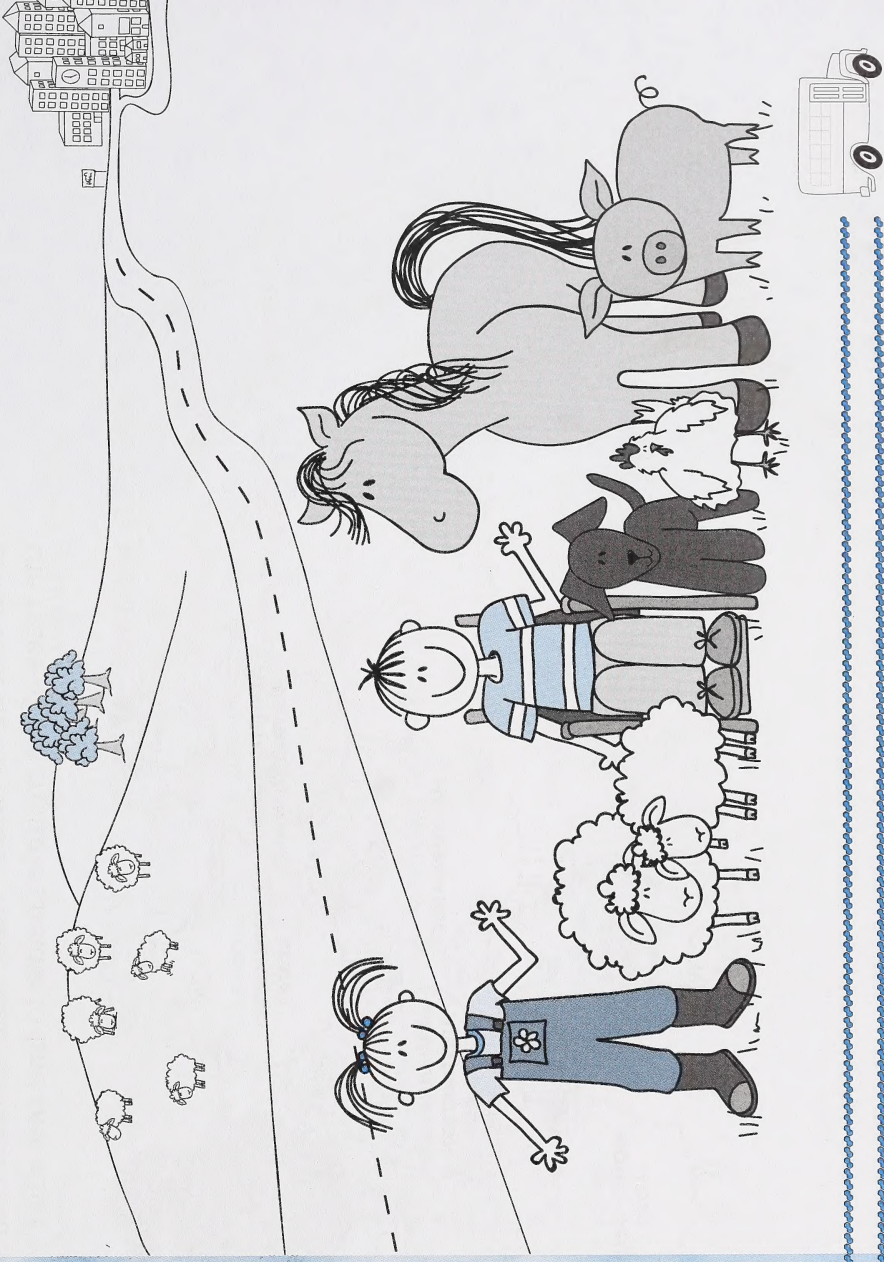
No part of this courseware may be reproduced in any form, including photocopying (unless otherwise indicated), without the written permission of Alberta Learning.

Every effort has been made both to provide proper acknowledgement of the original source and to comply with copyright law. If cases are identified where this effort has been unsuccessful, please notify Alberta Learning so that appropriate corrective action can be taken.

IT IS STRICTLY PROHIBITED TO COPY ANY PART OF THESE MATERIALS UNDER THE TERMS OF A LICENCE FROM A COLLECTIVE OR A LICENSING BODY.

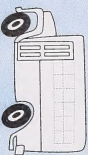
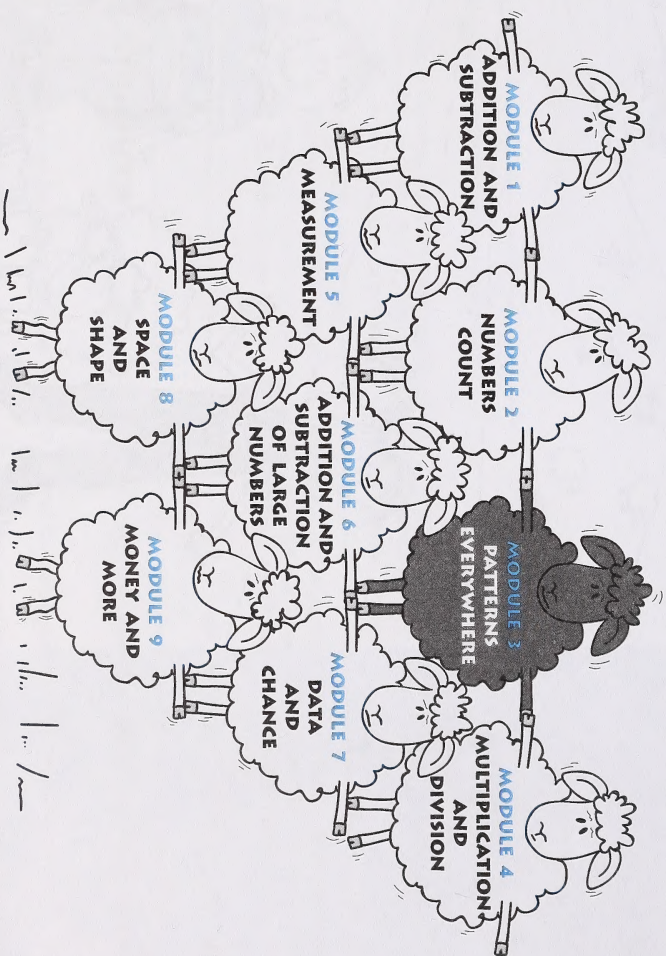
WELCOME

TO GRADE THREE MATHEMATICS



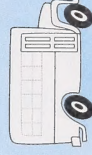
You may not realize it, but you use mathematics many times every day. You are using math when you count the money in your pocket, find a date on the calendar, or sort your toys. As you work through Grade Three Mathematics you will learn how to do many new things. You will also learn how math can be useful in solving everyday problems.


Each unit in the Grade Three Mathematics course is called a **module**. Read the titles of the modules below to find out what you will learn about this year.



CONTENTS

MODULE 3: PATTERNS EVERYWHERE	1	DAY 10: Calculator Fun	68
MATERIALS FOR MODULE 3	2	DAY 11: More Counting Patterns	73
DAY 1: Sorting Fun	3	DAY 12: Counting by 25s	78
DAY 2: Collections	8	DAY 13: Counting Backward	83
DAY 3: Patterns	14	DAY 14: Recognizing Number Patterns	91
DAY 4: Fences and Walls	24	DAY 15: Extending Number Patterns	97
DAY 5: More Patterns	33	DAY 16: Addition Patterns	105
DAY 6: Pattern Problems	39	DAY 17: Problem Solving	111
DAY 7: Can You Solve It?	45	DAY 18: Looking Back	119
DAY 8: Number Patterns	53	SUMMARY	120
DAY 9: More Skip Counting	61	APPENDIX	121





Digitized by the Internet Archive
in 2016 with funding from
University of Alberta Libraries

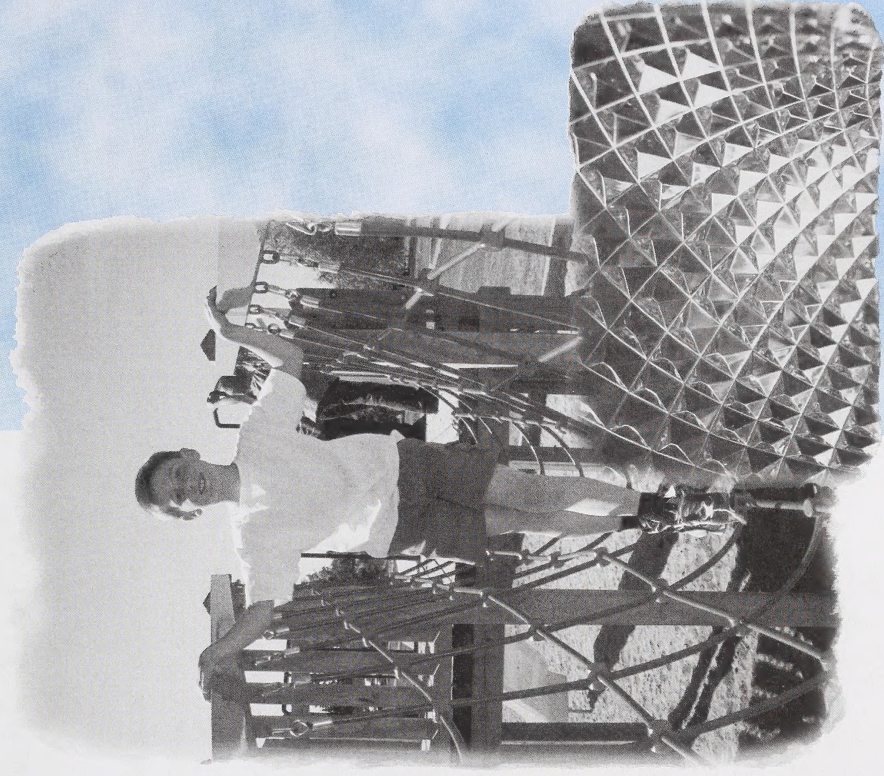
<https://archive.org/details/gradethreemathem03albe>

PATTERNS EVERYWHERE

The world is full of patterns. There are many patterns in nature and patterns in manufactured objects. There are many patterns in math too!

In this module you will experiment with different types of patterns. You will find and make patterns with real objects, pictures, and numbers. You will also have a chance to sort objects and state sorting rules.

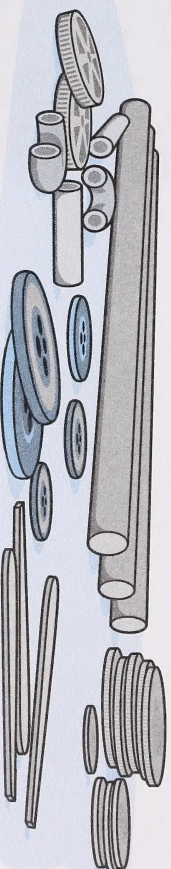
Learning how to understand patterns and sort objects can help you in many ways. Finding a pattern can often save you work in calculations or in problem solving.



MATERIALS FOR MODULE 3

For Module 3, you will need some of the following items. Small plastic bags or plastic containers are useful to hold your materials.

- an assortment of coins
- buttons (an assortment of sizes, colours, shapes, and holes)
- interlocking cubes or block cutouts from Day 6
- assorted pasta shapes (different shapes and colours)
- hundreds chart
- wooden craft sticks
- base ten blocks
- pattern blocks
- toothpicks
- a calculator (The TI-108 is recommended.)



Help your student gather these materials and place them in the Math Box for this module. Remove and store materials from previous modules that you will not need for this module.

Buttons are excellent manipulatives and can often be found at craft or variety stores. Other manipulatives, such as shells, seeds, pebbles, rocks, pine cones, beans, or candies, could also be used.

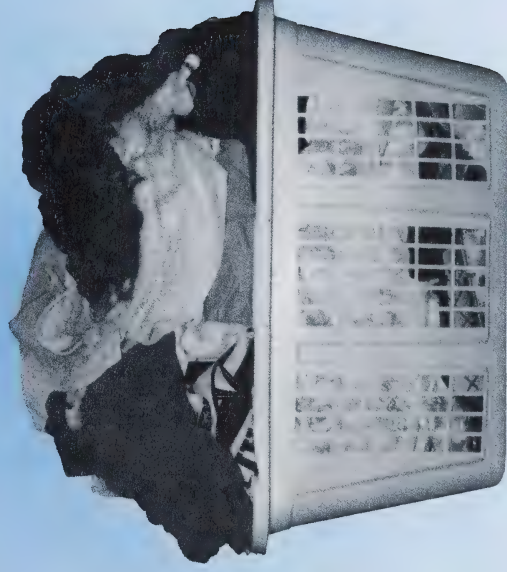


DAY 1: SORTING FUN

You often sort objects in everyday life.

Have you ever sorted laundry for your family? Did you sort it by colour, by fabric, or by who it belonged to?

Today's activities will give you a chance to sort objects in different ways and to think about the sorting rule that you use.



If necessary, remind the student about a sorting time. Most students have sorted coins to count them, sorted utensils and dishes, sorted toys into the correct container, or sorted food to put it into the correct cupboard or into the fridge. You may also want to discuss times when you have sorted items.

If you do not have a variety of buttons, you may use any other item that can be sorted in different ways. Household items (such as beans or coins) or objects from nature (such as shells, pine cones, or rocks) can be used. Adapt the activities to suit the objects you have chosen.

Colour is usually the first attribute students notice, but your student should be able to sort the buttons in several ways without help. If the student needs prompting, you may point out differences in size, shape, number of holes in the button, thickness, texture, materials of construction, and so on.

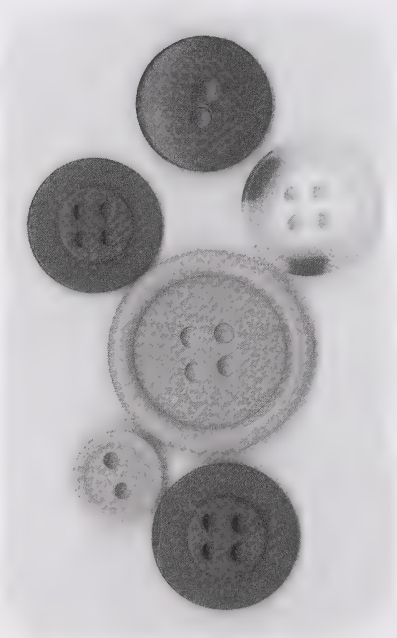


LESSON 1

Objects can be sorted or put into groups in many ways. Think of a time when you sorted something. How did you sort it? Tell your home instructor.



Take out your buttons.



1. Take out a handful of buttons. Think of a way to sort them into groups.
How did you sort the buttons? _____
2. Now sort them a different way. How did you sort them this time?

3. Think of a third way to sort them. How did you sort them this time?

When you put the buttons in groups, you probably sorted them by deciding on a sorting rule. You probably sorted the buttons by a feature, such as colour, size, or shape.

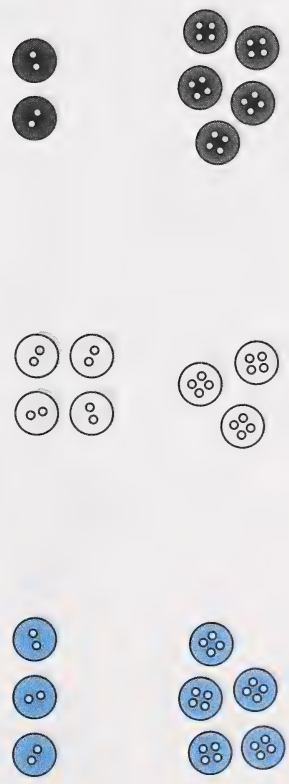
Watch as your home instructor sorts the buttons. Try to guess the sorting rule used. Tell your home instructor.

LESSON 2

You may sort objects by using two different features.

Look at the example.

- Sort by colour **and** number of holes.



Sort the buttons and ask the student to guess your sorting rule. Repeat several times.

If necessary, point out that the sorting for two features can be done in two stages. For example, the buttons can first be sorted by colour and then by number of holes.

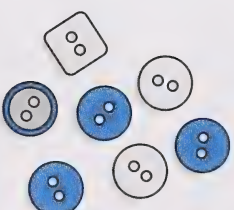
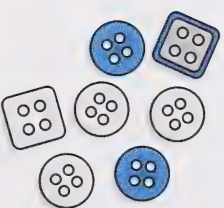


Check the groups after the student sorts the buttons. Did the student find the buttons with both features and group them?

Try the following rules. Use your buttons and show your home instructor your groups each time.

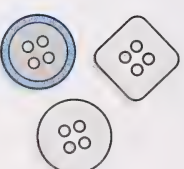
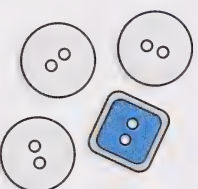
- Sort by size and shape.
- Sort by shape and colour.

Look at the sorted groups below. Try to guess the sorting rule used. Write the rule for each group.



1. _____

2. _____



3. _____

4. _____



Now you can play a game called *Guess My Rule*.



Take the assortment of coins from your Math Box.

Think of a way to sort the coins by choosing two features. Remember that coins have “heads” and “tails” and are different colours and different sizes. They also have different values.

Sort your groups. Then show them to your home instructor. Did your home instructor guess your sorting rule?

Think of another way to sort the coins. Ask your home instructor to guess again.

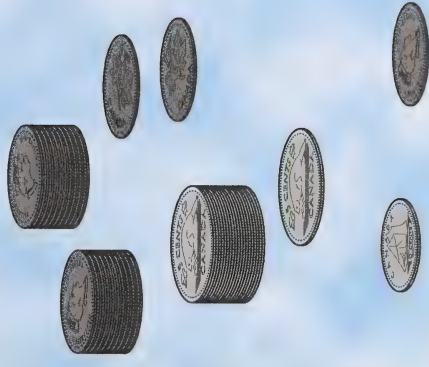
Repeat a few more times.



EXTENSION ACTIVITY

You can find different objects to sort and play this game with other family members. Natural objects, like shells, pebbles, seeds, leaves, grasses, and pine cones, are fun to sort. Small toys, cutlery, socks, shoes, pattern blocks, or different pasta shapes are also fun to sort.

When the student has sorted the coins, try to guess the sorting rule.



DAY 2: COLLECTIONS

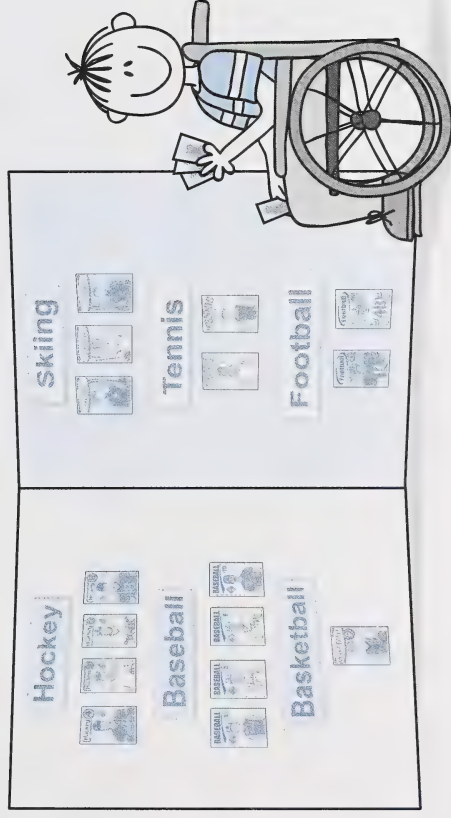
You sorted all kinds of different objects in Day 1.

Today, you will discuss collections and sort pictures into groups.



LESSON 1

Do you collect anything? Do any of your friends or family members have a collection? Tell your home instructor about collections you have seen. What was alike about the objects in the collection? What was different? Did the owner sort the objects in any special way to display them?



Luke's teacher asked everyone in the class to bring in a collection and display it. Luke decided to bring in his sports cards. He wanted to sort the cards into groups to display them.

Find "Sports Cards" in the Appendix.

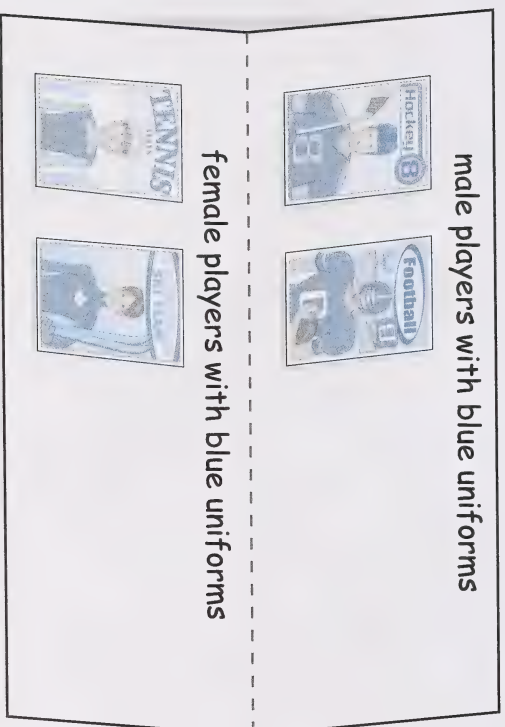
Discuss the student's personal collection or the collection of any family member or friend. Have the student tell what was similar about each collection. Also, have the student discuss how the objects in each collection differ and how they could be sorted differently. You may also discuss collections you have or have had in the past.



DAY 2

Help Luke sort and display his sports-card collection.

- Cut out the sports cards. Think of a way to sort them by two or more features.
- Fold a sheet of white paper in half. Write your sorting rule on each half. If you have more sorting rules, you will have more groups and will need extra paper.
- Glue the cards under the correct rule as the example shows.

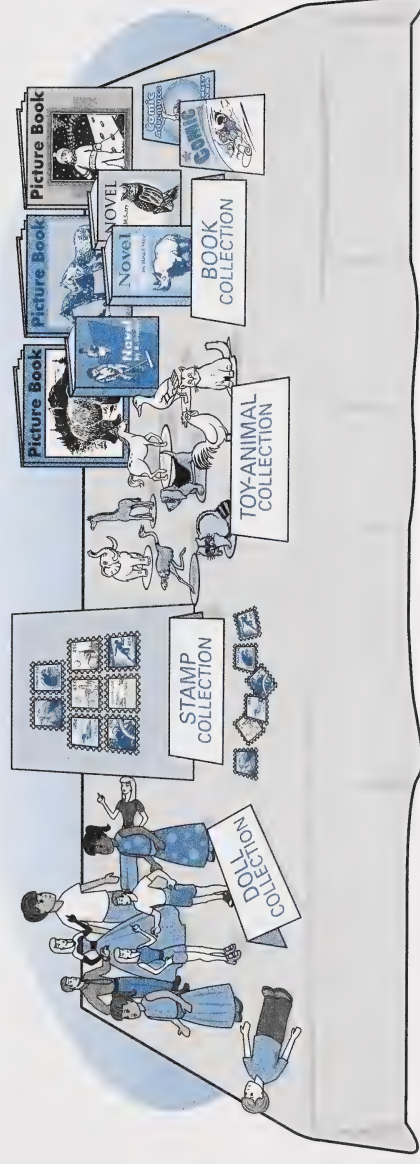


When the glue dries, write your name and "M3-D2" on the back of the papers. Put your papers into your Student Folder. You will send them to your teacher on Day 9.



LESSON 2

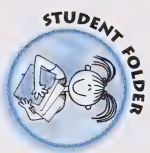
The students in Luke's class had many different kinds of collections. They sorted and labelled them. A beautiful display was created. Many people enjoyed looking at the displays, but many displays got mixed up.



Find “Collections” pages in the Appendix, and use the following steps to help sort the displays for Luke’s class.

- Cut out the pictures of the display items.
- Sort them into collections.

- Then sort each collection into groups. Try to sort by two or more features as this example shows.
- Use sheets of white paper. Put the name of the collections at the top. Then write a sorting rule to describe each group.
- Glue the cards under the correct label.



When the glue has dried, write your name and "M3-D2" on the back of the papers. Put the papers into your Student Folder. You will send them to your teacher on Day 9.

You have practised addition number facts in Modules 1 and 2. In Module 3, you will practice subtraction facts. You may want to review Days 5, 6, and 7 in Module 1 for subtraction strategies.

When you are ready, ask your home instructor to time you for 2 minutes. Write how many you completed. Ask your home instructor to mark the questions and to write how many were correct. Remove the "Subtraction Facts Graph" from the Appendix and colour in the number you had correct.

Toy Animals	
White, 4-Legged	
Small, 4-Legged	
Large, 4-Legged	



TIMED EXERCISE: 2 MINUTES

$14 - 7 = \underline{\hspace{2cm}}$

$12 - 8 = \underline{\hspace{2cm}}$

$16 - 9 = \underline{\hspace{2cm}}$

$12 - 7 = \underline{\hspace{2cm}}$

$11 - 8 = \underline{\hspace{2cm}}$

$16 - 7 = \underline{\hspace{2cm}}$

$12 - 6 = \underline{\hspace{2cm}}$

$11 - 4 = \underline{\hspace{2cm}}$

$15 - 7 = \underline{\hspace{2cm}}$

$14 - 5 = \underline{\hspace{2cm}}$

$13 - 9 = \underline{\hspace{2cm}}$

$17 - 8 = \underline{\hspace{2cm}}$

$$\begin{array}{r} 12 \\ - 5 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ - 2 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ - 7 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ - 6 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 17 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - 6 \\ \hline \end{array}$$

Number completed	
Number correct	



DAY 3: PATTERNS

Patterns are all around you! Today you will find some patterns in your home or yard. You will also have a chance to build and extend patterns.

Are you ready to go on a pattern hunt?



LESSON 1

What is a pattern? Tell your home instructor in your own words.

Yes, a **pattern** is any arrangement of shapes, colors, numbers, or any other features that keeps repeating.

Look around your home or yard. Can you find ten patterns?

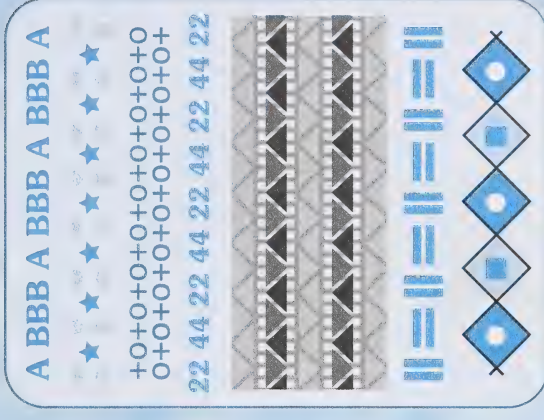
Write a list to tell where you found patterns.

1. _____ 2. _____
3. _____ 4. _____
5. _____ 6. _____
7. _____ 8. _____
9. _____ 10. _____

What type of patterns did you notice? Did you see any patterns in a line? Did you see patterns on flat surfaces? Tell your home instructor.

Your student has worked with patterns in grade one and grade two. He or she should be able to tell you that patterns have elements that repeat in a predictable way. The student may give examples of how patterns repeat.

The student may have noticed linear patterns on fabric, furniture, tiles, borders, vehicles, or rugs. Areas like floors, carpets, walls, and bedding may have two-dimensional patterns.



LESSON 2

Do you remember making patterns in grade one and grade two?



Take your pasta shapes out of your Math Box.

- Make a pattern in a line with the pasta shapes. Make sure the pattern repeats in some way. A pattern that repeats in a line is called a **linear** pattern.

The student will most likely describe the pattern using the colour or shape of the pasta.

- Describe your pattern to your home instructor. For example, you might describe your pattern like this.

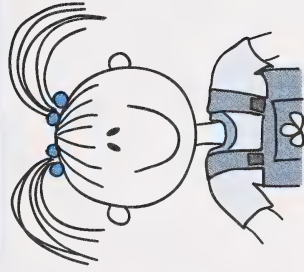


shell macaroni macaroni shell macaroni macaroni

1. Make a new pattern. Record it here.

Did you use drawings or words? Can you think of another way to record this pattern? Tell your home instructor.

I know that a pattern can be described or recorded by giving each different item in the pattern a letter. If I call the shells **A** and the macaroni **B**, I can say the pattern is **ABB**. The pattern repeats.



How did the student record the pattern? Some will draw the pasta; some will write words to describe it; others may remember using letters or numbers to record patterns.

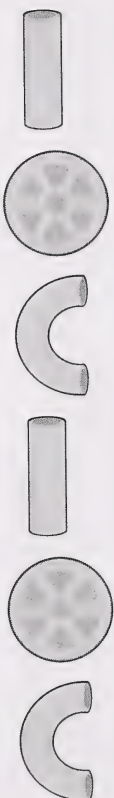
If necessary, remind the student that only the letters for the non-repeating part are necessary. For example, if the pattern is red, red, green, blue, red, red, green, blue, the letter pattern is AABC, not AABCAABC.

2. Write a letter pattern for the macaroni pattern you made.

3. Make a different pattern. Write a letter pattern for it.

4. Write a letter pattern for the pictures below.

a.



b.



Patterns can be formed in many different ways. Any feature can be used to form a pattern.

Colour:



Shape:



Direction:



Size:



5. Colour the squares below to make a pattern. Describe your pattern.

--	--	--	--	--	--	--	--	--	--

LESSON 3

Since patterns repeat, you can predict what will come next or what is missing from a pattern.

- Make a pattern with your pasta. Make sure the pattern repeats 3 times.

Your home instructor will cover part of the pattern. Can you tell what pasta shapes are covered? Look at the rest of the pattern for a clue.

- Build a new pattern. Then cover part of the pattern with your hand. Can your home instructor tell what pasta shapes are covered?

Cover part of the student's pattern with your hand. Can the student tell you what shapes are under your hand?

Look at the patterns below. What shapes are missing? Draw the missing shapes on the lines.

1. a.



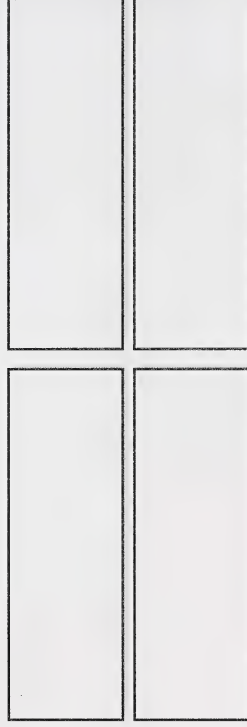
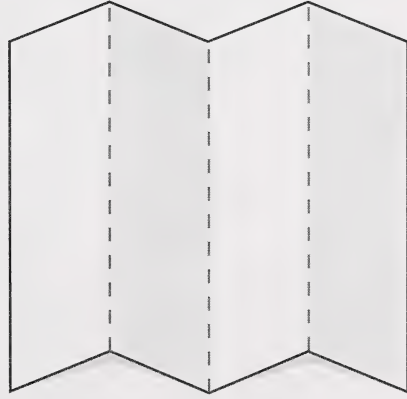
b.





Take out your coins or pattern blocks.

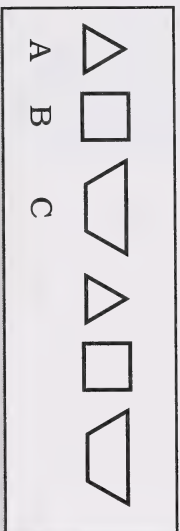
- Cut a piece of paper into four strips.



- Make four linear patterns using your coins or blocks. Make each pattern repeat at least two times. Draw a pattern on each strip of paper like this.



- Write a letter pattern for each strip.



- Use pasta to make the same pattern as you drew in each strip.



A B C

2. Draw the next two shapes for each pattern.

a.



b.





EXTENSION ACTIVITY

Sounds can make patterns too. For extra practice with patterns, you can make up sound patterns by clapping your hands, tapping your feet, and snapping your fingers. Make up a pattern and have a family member extend it. Ask a family member to give you a letter pattern, such as AABB and make up a sound pattern to match it. Have fun!



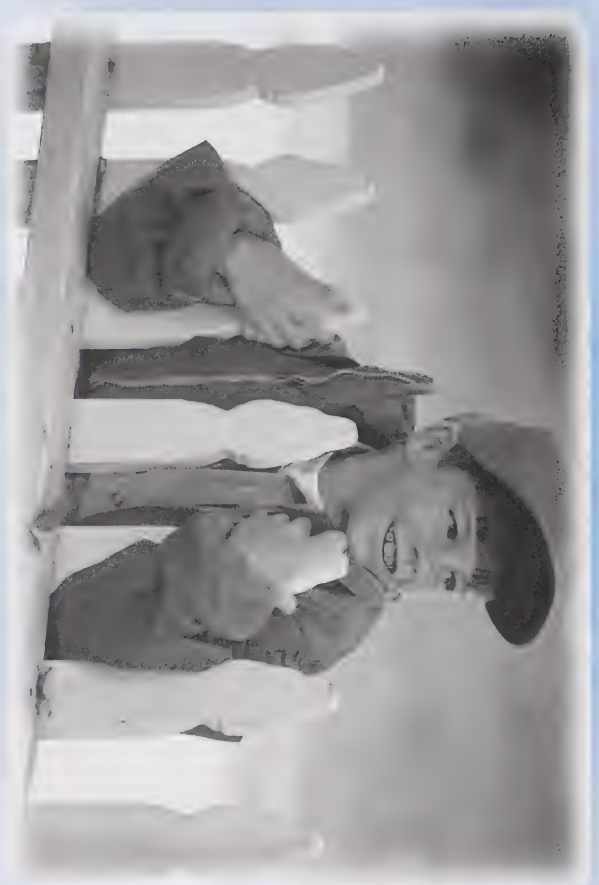
Go to Assignment Booklet 3A.



DAY 4: FENCES AND WALLS

Can you find a pattern on a wallpaper border on a wall? Have you ever noticed a pattern made by a fence?

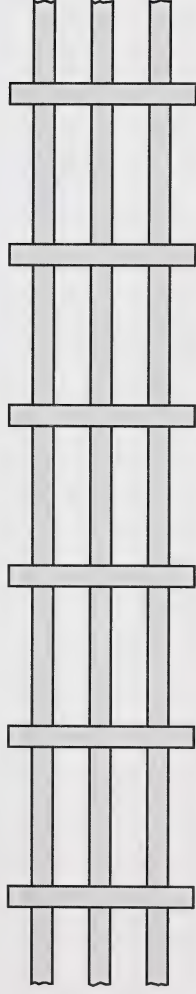
Today, your challenge will be building fences and wall patterns. You will also practise telling about how the pattern repeats.



LESSON 1

Sarah noticed that the fences on their farm had interesting patterns. Do you have any fences around your home? Does the fence form a pattern? Tell your home instructor about the fence pattern you notice.

The corral fences at Sarah's farm looked like this.



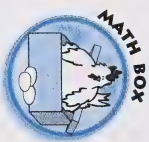
1. What pattern do you see in this fence? _____

When you did sorting activities, you wrote a sorting rule to tell how you sorted the items. You can make up rules for patterns, too. A pattern rule tells how the pattern repeats.

The pattern rule for Sarah's fence is one post up and down and three boards across. Did you get it right?

Discuss the patterns formed by fences around your home. Next time you are driving somewhere, have the student watch for fence patterns. The student may enjoy recording the fence patterns by drawing them or by recreating them with toothpicks.



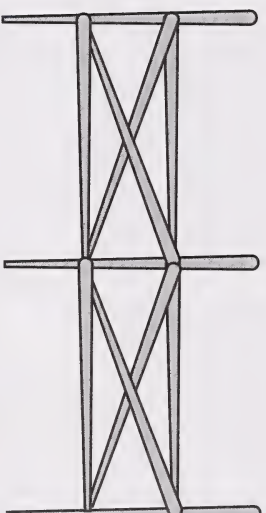


Take some toothpicks out of your Math Box.

Pretend you are building fences around your home. Use the toothpicks to make the model fences. Make sure the fence pattern repeats at least twice. Remember, real fences often end with an extra post so they don't fall down!

Show the fence to your home instructor. Can your home instructor guess the pattern rule?

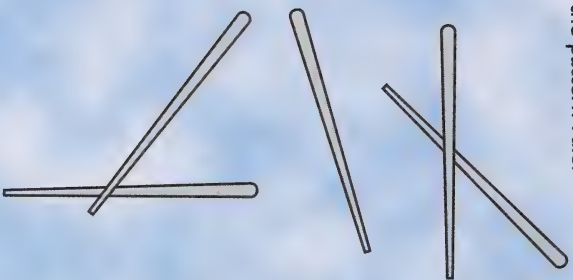
2. An example is made for you. Use the toothpicks to make three different fence patterns. The boards can go up and down, across, or at a slant. Record your fences by drawing them in the spaces. Then write a pattern rule for each.



Pattern rule: one post up and down, 2 boards across with 2 boards

crossed

Look at the student's fence and try to guess the pattern rule.



a.

Pattern rule: _____

b.

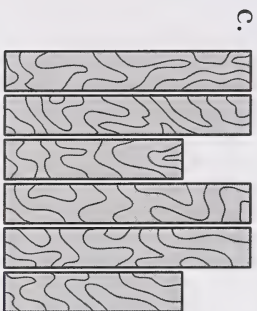
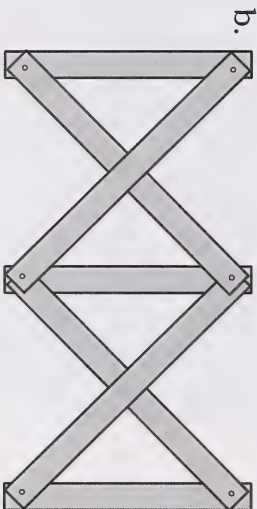
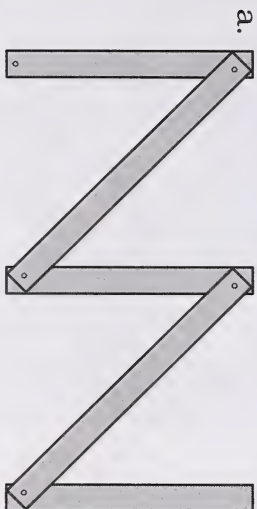
Pattern rule: _____

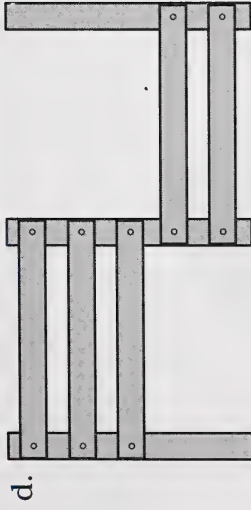
c.

Pattern rule: _____



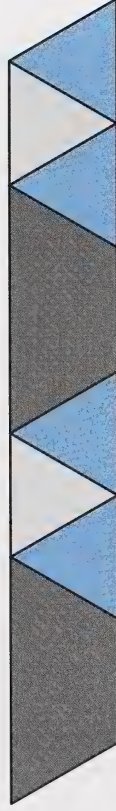
3. Look at the following fences, and think about the pattern rule. Then use the pattern rule to draw two more sections for each fence.





LESSON 2

The bathroom tiles in Luke's house made a pattern that looked like this.



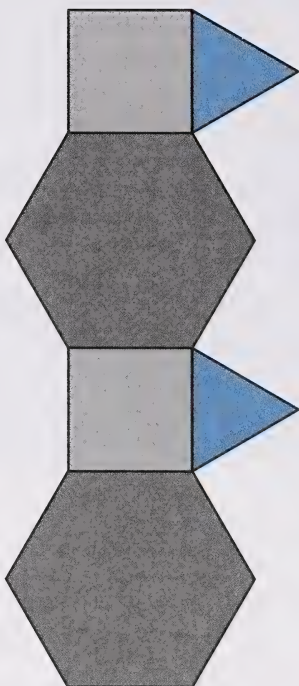
Write a pattern rule for the tile design. _____



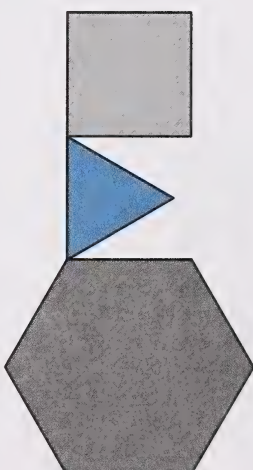
Find your pattern blocks. If you do not have pattern blocks, use the pattern-block cutouts from Module 2.

The student may write the names of the shapes for the pattern rule or write a letter pattern.

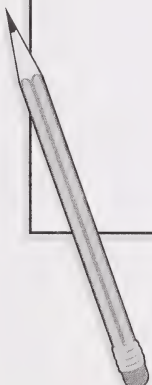
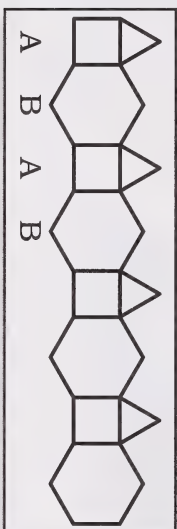
Use your pattern blocks to make two wall designs. The blocks should be touching, not just be placed side by side.



Not



Fold a piece of paper in half, and cut it into two strips.



Record the wall designs you made. Put one design on each strip. Write a pattern rule under each design.

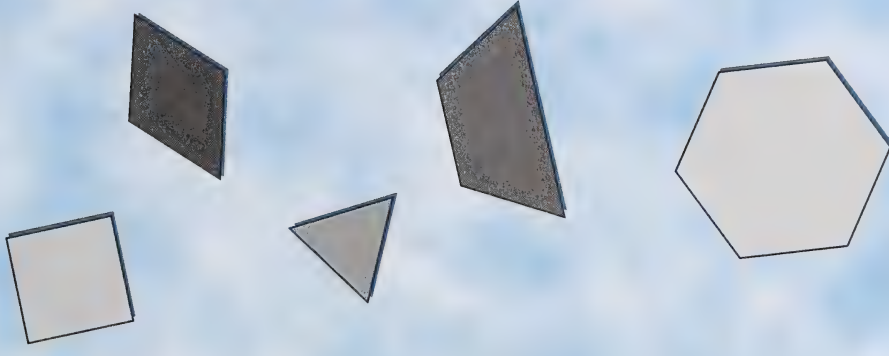


Write your name and "M3-D4" on the back of the papers. Put them in your Student Folder. You will send it to your teacher on Day 9.



Are you ready for your timed exercise? Ask your home instructor to time you for 2 minutes. Write how many you completed. Ask your home instructor to mark the questions and to write how many were correct.

Colour in the number you got correct on your Subtraction Facts Graph.



TIMED EXERCISE: 2 MINUTES

$$13 - 6 = \underline{\hspace{2cm}}$$

$$12 - 8 = \underline{\hspace{2cm}}$$

$$15 - 9 = \underline{\hspace{2cm}}$$

$$11 - 6 = \underline{\hspace{2cm}}$$

$$10 - 8 = \underline{\hspace{2cm}}$$

$$15 - 7 = \underline{\hspace{2cm}}$$

$$11 - 7 = \underline{\hspace{2cm}}$$

$$12 - 4 = \underline{\hspace{2cm}}$$

$$15 - 8 = \underline{\hspace{2cm}}$$

$$14 - 7 = \underline{\hspace{2cm}}$$

$$13 - 5 = \underline{\hspace{2cm}}$$

$$16 - 8 = \underline{\hspace{2cm}}$$

$$\begin{array}{r} 11 \\ -4 \\ \hline \end{array}$$

$$\begin{array}{r} 18 \\ -9 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ -3 \\ \hline \end{array}$$

$$\begin{array}{r} 14 \\ -6 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ -5 \\ \hline \end{array}$$

$$\begin{array}{r} 17 \\ -8 \\ \hline \end{array}$$

$$\begin{array}{r} 16 \\ -7 \\ \hline \end{array}$$

$$\begin{array}{r} 11 \\ -9 \\ \hline \end{array}$$

Number completed	
Number correct	



DAY 5: MORE PATTERNS

When you found patterns around your home, you probably noticed patterns on rugs, bedding, or walls. Many patterns have both length and width.

In today's activities, you will build and extend patterns that cover a larger flat surface. Quilts are excellent examples of this type of pattern.

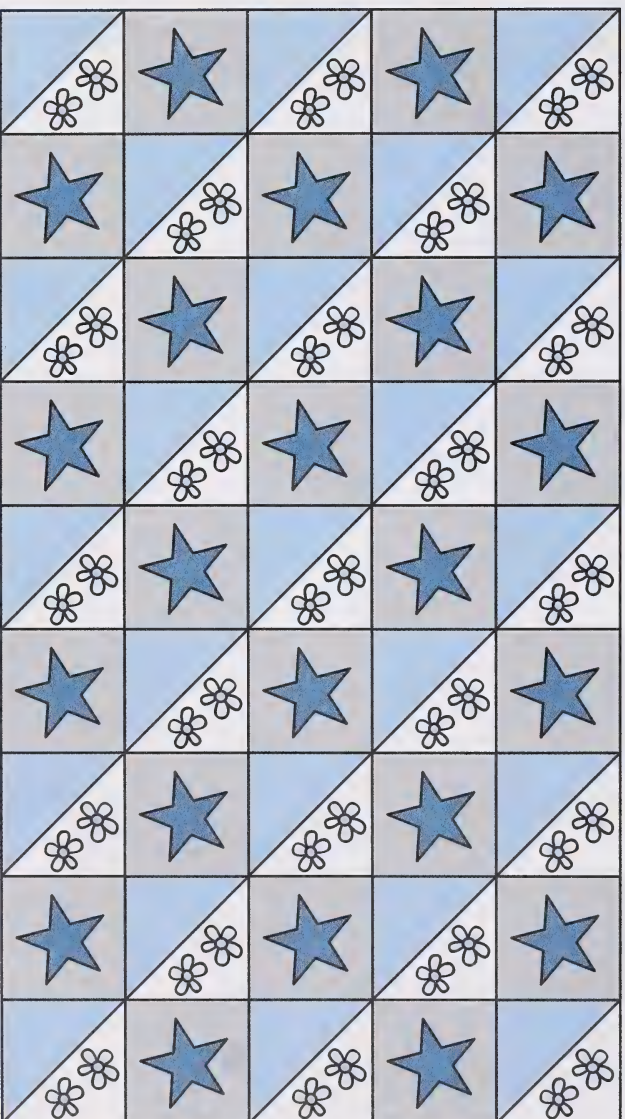


Can the student describe the pattern accurately? Can the student see how the pattern extends in two dimensions?

Find a pattern in your home that covers a large flat surface. Bedding, wallpaper, floor coverings, or curtains cover flat surfaces and often have patterns with height and length. These are called **two-dimensional** patterns.

Look carefully at the pattern. Tell your home instructor how the pattern repeats.

Sarah's bed has a quilt that her grandmother made for her. Look at the pattern on Sarah's quilt.



1. Describe the pattern on Sarah's quilt.

2. How does the pattern repeat?



Take out your pattern blocks. If you do not have pattern blocks, use the pattern-block cutouts from Module 2.

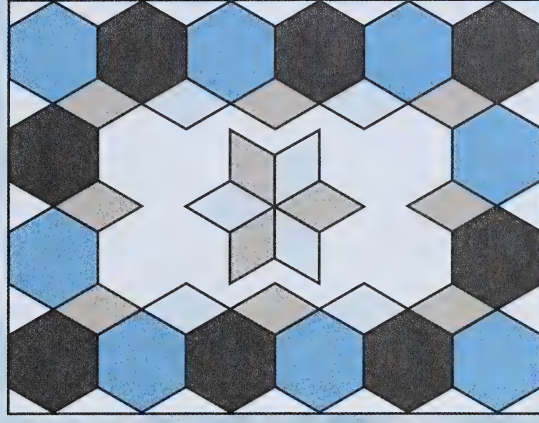
Find "Triangle Grid" in the Appendix, and remove it.

Use your pattern blocks on the triangle grid to create a large pattern.

3. Describe your pattern.

4. How does your pattern repeat?

Record your pattern by colouring the triangle grid to match your pattern.



If your student has difficulty colouring the pattern on the grid, have him or her trace each block as they remove it. After the blocks are traced, they can be removed and the grid coloured.





Write your name and "M3-D5" on the back of the paper. Put it in your Student Folder. You will send it to your teacher on Day 9.

LESSON 2

Two-dimensional patterns may repeat going across (**horizontally**), going up and down (**vertically**), or at a slant (**diagonally**). You can use this repetition to extend the pattern or tell what is missing from a pattern.

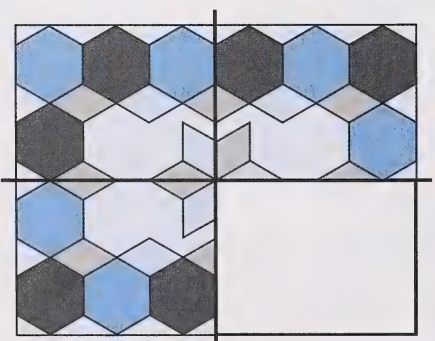
Cut a piece of paper into four parts.

Take one of the paper pieces and cover your pattern from Lesson 1.

Ask your home instructor to predict what shapes are under the paper. Can the home instructor predict the hidden shapes?

Your home instructor will build a pattern with the pattern blocks and cover part of the pattern. Can you predict what shapes are under the covered part?

1. How did you predict the missing parts? _____



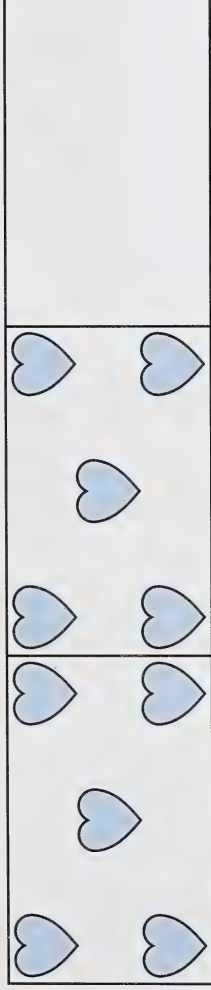
Share your thinking as you predict what is under the paper. For example, you may express there must be hexagons around the edge of the corner, because hexagons are on the edge in all the other corners.

Build a two-dimensional pattern using the pattern blocks. Cover one quarter of the pattern with a piece of the paper. Ask the student to tell you what is under the paper.

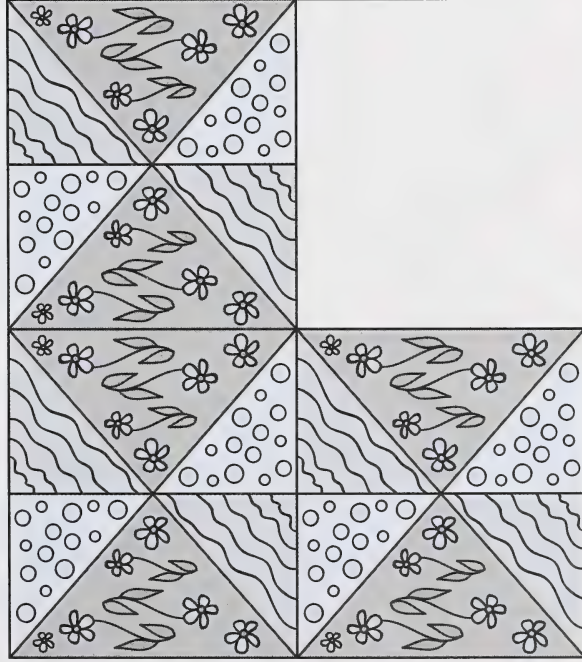


2. Look at the following patterns. Part of each pattern is missing. Draw in the missing part.

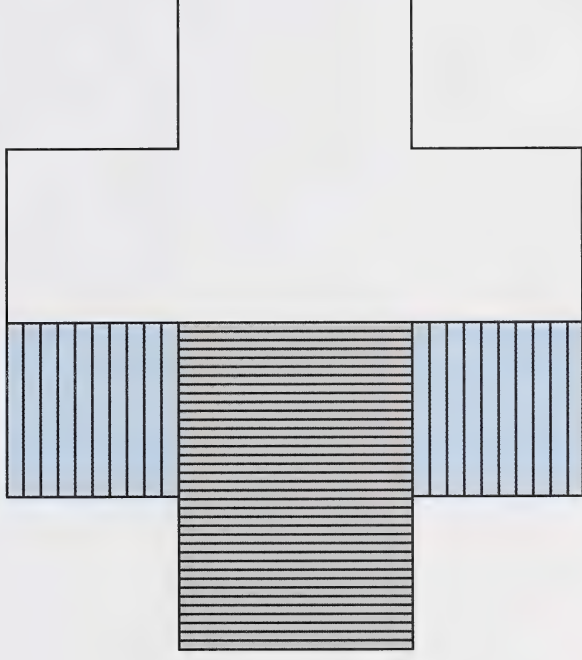
a.



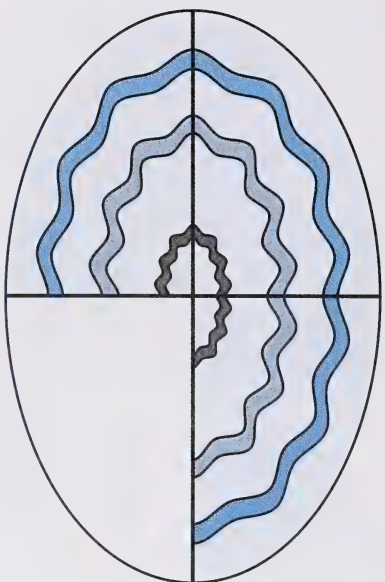
b.



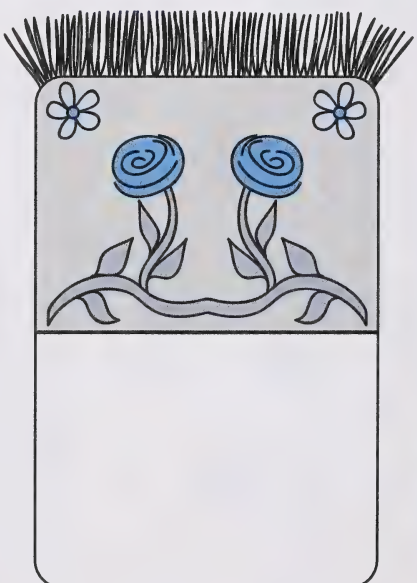
c.



d.



e.



EXTENSION ACTIVITY

For more practise with patterns, you and your family may want to visit a rug or quilt show or a home-decorating store. You will notice many interesting patterns on quilts or on floor and wall coverings. Take turns describing how the pattern repeats for each design.

When you get home, pretend that you are redecorating your room. Draw some designs for your room. What type of quilt would you design for your bed? What type of wallpaper or border would you like? Can you design a rug for your floor?



Go to Assignment Booklet 3A.



DAY 6: PATTERN PROBLEMS

Finding a pattern can help you make predictions and solve problems. It's fun and useful to discover patterns in numbers and in real life.

Are you ready to try some pattern problems?

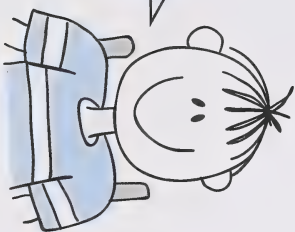




Luke arranged his toy vehicles into a pattern.

Do you notice the pattern? _____

The pattern is car, car,
van, truck!



That's right, Luke!
If the same pattern
continues, what would
the 16th vehicle be?



1. What does Luke have to find out?

Understand
the
problem.

2. How could you solve this problem? _____

Make
a
plan.

Encourage the student to think of at least two different ways to solve the problem.

Before you can predict what the 16th vehicle will be, you need to know the pattern rule.

3. What is the pattern rule? _____

There are several ways to solve the problem.

You could do the following to help you:

- continue the pattern by drawing the 16 vehicles
- give each vehicle a letter until you have 16 letters
- act it out using a different-coloured counter for each vehicle until you have 16 counters

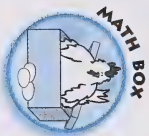
4. Solve the problem. Show your work.

5. Write a sentence to answer the question in the problem.



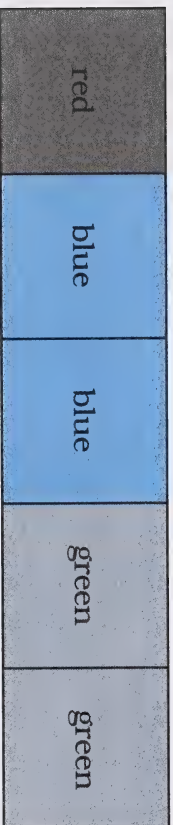
Look back.

6. Reread the problem. Does your sentence answer the question that is asked in the problem?
Does the answer make sense? _____



Take out your interlocking cubes. If you do not have interlocking cubes, find the "Block Cutouts" in the Appendix.

7. Use your cubes or block cutouts to make this pattern.



How many of each colour will you have if you continue the pattern until it is 25 blocks long?

a. What do you have to find out? _____

Understand the problem.



Make
a
plan.

b. What is the pattern rule that you need to know?

c. How could you solve this problem?

d. Solve the problem. Show your work.

e. Write a sentence to answer the question in the problem.

f. Reread the problem. Does your sentence answer the question that is asked in the problem? Does the answer make sense?

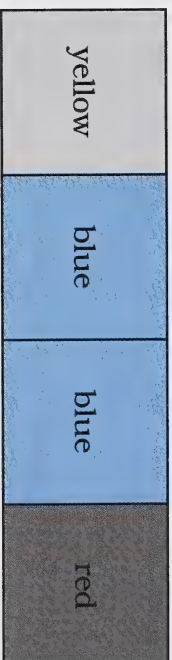
Look
back.

Some students may choose to use the blocks to build the chain of 25 and then count how many there are of each colour. Some students may develop other strategies.

If the student built the pattern with blocks, remind him or her to record the pattern in some way—by drawing and colouring, by using letters, or by writing the colour words.



8. Build this pattern.



If the pattern keeps going, what colour will the 20th block be?



a. Use the problem-solving steps and your favourite strategy to solve the problem. Show your work. Write the answer in a sentence.

Solve the student's problem using your own method. Explain your thinking as you find the answer.

b. Use your blocks to make a new pattern. Write a problem-solving question about your pattern. Ask your home instructor to solve it.



Go to Assignment Booklet 3A.

DAY 7: CAN YOU SOLVE IT?

In today's lesson, you will use patterns to help you solve more challenging problems.

Understanding the pattern can often make solving a tricky problem easier.



This problem poses a question that your student will not have enough blocks to solve. The student should realize that he or she can use the pattern to predict the answer without making or drawing the whole pattern.

You have used real things, like blocks, coins, and pasta shapes, to help you continue patterns. You have also used letters or words to help you tell about a pattern. Can you use what you have learned to find the answer to the problem below?

1. Sarah was making a design with pattern blocks. Her design looked like this.



She added more blocks.



She then added more blocks.



Sarah kept building this design and used 40 triangle blocks. How many blocks did she use in total?

Understand
the
problem.

a. What do you have to find out? _____

Make
a
plan.

b. How could you solve this problem? _____

Try
the
plan.

c. What is the pattern? _____

How could the pattern help you solve the problem?

When Sarah used 1 triangle block, she used 2 trapezoid blocks. When she used 2 triangle blocks, she used 3 trapezoid blocks. When she used 3 triangle blocks, she used 4 trapezoid blocks.

d. What pattern do you see? _____

e. When Sarah has used 40 triangle blocks, she will have used _____ trapezoid blocks.

f. Now add the two numbers to find the total blocks she will have used. Show your work.

g. Write a sentence to answer the question in the problem.

Look
back.

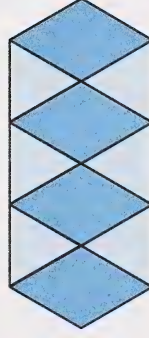
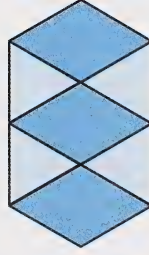
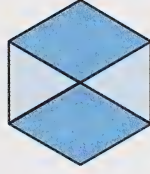
h. Reread the problem. Does your sentence answer the question that is asked in the problem?
Does the answer make sense?

Using the pattern helped you solve this problem without taking the time to build the whole pattern. Patterns can often help you solve problems in a simpler and quicker way.



Now, try this problem.

2. Luke made a pattern that looked like this.



How many triangle blocks will Luke need if he uses 31 diamond blocks?

- a. What do you have to find out?

Understand
the
problem.

You may need to remind your student to subtract the extra block from the number of diamonds, and then double the number to find out how many triangles there would be. If this concept is difficult, allow the student to make the pattern with blocks or draw the pattern.

Make
a
plan.

b. How could you solve this problem?

Think about the pattern. When there were 2 diamond blocks, there were 2 triangles. When there were 3 diamond blocks, there were 4 triangles. When there were 4 diamond blocks, there were 6 triangles. For each diamond, there are two triangles plus one more diamond at the end.

c. Solve the problem. Show your work.

Write a sentence to answer the question in the problem.



Look
back.

- d. Reread the problem. Does your sentence answer the question that is asked in the problem? Does the answer make sense?

Using patterns can help you find a simpler way to solve a problem. Math contains many kinds of patterns that can help you solve problems.

Are you ready for your timed exercise? Ask your home instructor to time you for 2 minutes. Write how many you completed. Ask your home instructor to mark the questions and to write how many were correct. Colour in the number you got correct on your Subtraction Facts Graph.



TIMED EXERCISE: 2 MINUTES

$14 - 6 = \underline{\quad}$

$13 - 8 = \underline{\quad}$

$16 - 9 = \underline{\quad}$

$12 - 6 = \underline{\quad}$

$14 - 8 = \underline{\quad}$

$14 - 7 = \underline{\quad}$

$10 - 7 = \underline{\quad}$

$13 - 4 = \underline{\quad}$

$17 - 8 = \underline{\quad}$

$12 - 7 = \underline{\quad}$

$13 - 5 = \underline{\quad}$

$15 - 8 = \underline{\quad}$

12

17

11

15

$\begin{array}{r} 12 \\ - 4 \\ \hline \end{array}$

$\begin{array}{r} 17 \\ - 9 \\ \hline \end{array}$

$\begin{array}{r} 11 \\ - 3 \\ \hline \end{array}$

$\begin{array}{r} 15 \\ - 6 \\ \hline \end{array}$

11

16

15

12

$\begin{array}{r} 11 \\ - 5 \\ \hline \end{array}$

$\begin{array}{r} 16 \\ - 8 \\ \hline \end{array}$

$\begin{array}{r} 15 \\ - 7 \\ \hline \end{array}$

$\begin{array}{r} 12 \\ - 9 \\ \hline \end{array}$



Go to Assignment Booklet 3A.



GRADE THREE MATHEMATICS

Number completed	
Number correct	

DAY 8: NUMBER PATTERNS

You have worked with shape and picture patterns in the last few lessons. Numbers also form many kinds of patterns.

In today's activities, you will look at the patterns that are formed when you skip count by 2s and 5s. You will also practise counting on from a number.

Number patterns can help you solve problems. They can also help you add, subtract, and multiply.



Listen as your student counts by 2s to 100. Your student should be able to do this easily, since this skill was practised in earlier grades. If your student has any difficulty, practise skip counting using a loud and quiet voice. Start at 2, then say the target numbers louder—2, 3, 4, 5, 6, 7, 8, 9, 10, and so on.

LESSON 1

You worked with number patterns in grade one and in grade two. You probably remember how to skip count by 2s. Start at 2 and skip count to 100 for your home instructor.

Skip counting with numbers past 100 is easy, too. Look at the chart below. It shows the numbers from 101 to 200.

101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200



1. Start at 102 and skip count by 2. Colour each number that you say as you skip count.

2. What pattern is formed by the coloured numbers?

3. Are the numbers even or odd? _____

4. Count by 2s. What numbers come next?

a. 134 _____

b. 168 _____

c. 190 _____

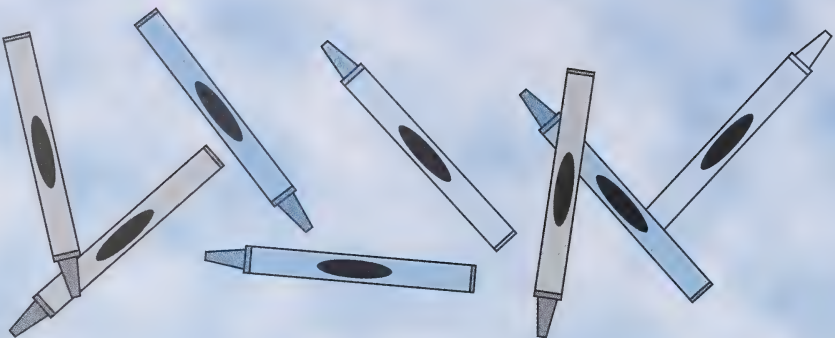
5. What pattern do you think you would see if the chart showed the numbers from 901 to 1000?

6. Look at the chart on the next page. Try skip counting by 2s again but start from 601. Colour each number as you say it.

If necessary, remind your students that the squares going across the hundred chart are called **rows** and the squares going up and down are called **columns**. To help the student remember, you may say that the rows in a theatre go across, while the columns on a building go up and down. Point out a column on a building next time you see one to reinforce this point.

If counting by 2s is difficult, the student can refer to the chart.





Your student should realize that the pattern will remain the same when the hundreds digit changes.

601	602	603	604	605	606	607	608	609	610
611	612	613	614	615	616	617	618	619	620
621	622	623	624	625	626	627	628	629	630
631	632	633	634	635	636	637	638	639	640
641	642	643	644	645	646	647	648	649	650
651	652	653	654	655	656	657	658	659	660
661	662	663	664	665	666	667	668	669	670
671	672	673	674	675	676	677	678	679	680
681	682	683	684	685	686	687	688	689	690
691	692	693	694	695	696	697	698	699	700

7. What pattern do you notice? _____

8. Are the numbers even or odd? _____

9. What pattern would you see if the chart showed 801 to 900 or 501 to 600?

The pattern stays the same as you skip count by 2s to higher numbers. You must remember to switch to the next hundred after completing the nineties. For example, after 798, you go to 800. After 699, you go to 701.

10. Count by 2s. What numbers come next?

a. 551 _____

b. 367 _____

c. 792 _____

d. 493 _____

LESSON 2

You can use a hundred chart to help you skip count or count on from any number. The pattern stays the same when the hundred's digit changes.

Find and remove the "Hundred Chart" in the Appendix.



Take out your buttons.

If skip counting is difficult, have your student practise counting on by 1s from the nineties for each hundred. For example, ask the student to count 197, 198, 199, 200. Then 297, 298, 299, 300.

Your student can use manipulatives and a hundred chart to discover patterns for any skip-counting activity.

The student may substitute any small manipulative for buttons (e.g., interlocking blocks, pennies, or bingo chips).



3

8

13

18

23

Count by 5s starting at 5. Put a button on each number as you say it.

1. What pattern do you see? _____

2. Count by 5s. What numbers come next? Remember, you can use the pattern from the chart to predict what comes next for larger numbers. You may need to go on to the next hundred for some numbers.

a. 45 _____

b. 230 _____

c. 585 _____



What happens when you start from a number that doesn't end in 5 or 0?

Take the buttons off your hundred chart. Start at 3 and count by 5s. Cover every fifth number with a button.



Be sure your student is covering every fifth number. If necessary, help the student count **3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13**, and so on.

Some students may need to use their fingers to help them find every fifth number. Say **3** (it is the target number). Then have the student count on and put up a finger as each number is counted: **4** (one finger), **5** (two fingers), **6** (three fingers), **7** (four fingers), **8** (five fingers). Every time five fingers are reached, it is a target number.

3. What pattern do you notice? _____

4. What digits do you see at the end of the numbers you have covered? _____

Take the buttons off your hundred chart. Start at 4 and count by 5s. Cover every fifth number with a button.

5. What pattern do you notice? _____

6. What digits do you see at the end of the numbers you have covered? _____

7. Count by 5s. What number comes next? Use your hundred chart and buttons if you need to.

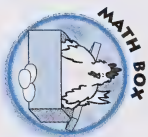
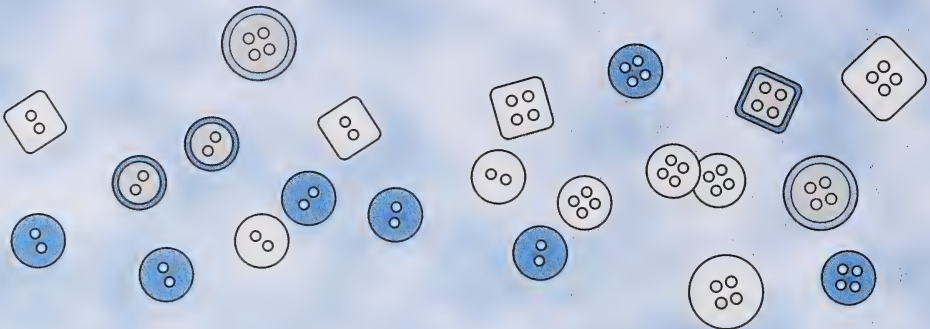
a. 28 _____

b. 133 _____

c. 334 _____

d. 572 _____

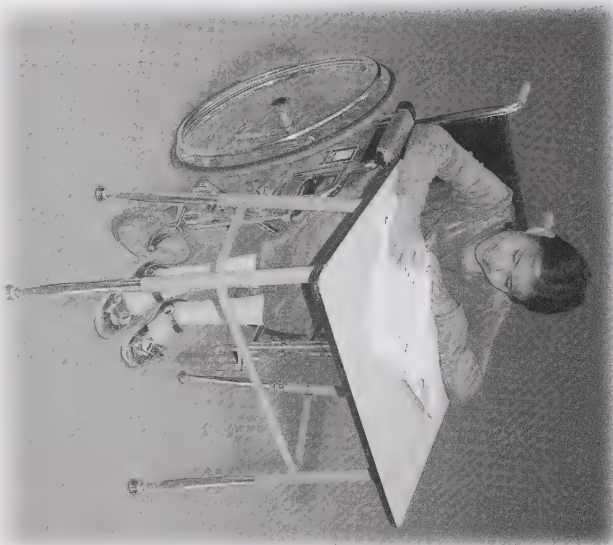




Put your hundred chart in your Math Folder. You will need it for other activities.



Go to Assignment Booklet 3A.



DAY 9: MORE SKIP COUNTING

Today, you will use a hundred chart to help you discover number patterns that are made when you count by 10s.

You will practise skip counting by 10s and 100s from different numbers, too.

10, 20, 30, 40, 50, 60 . . .



LESSON 1

Skip counting by 10s is easy. It is probably one of the first number patterns you learned.

What pattern do you think counting by 10 will make on a hundred chart? Tell your home instructor.

Have the student predict what pattern counting by 10 will make on a hundred chart.



Find your hundred chart and buttons.

Skip count by 10, starting at 10. Put a button on each number as you say it.

1. What pattern did you make? _____
2. What digit does each of the covered numbers end with? _____
3. How does the first digit change each time? _____

Was your prediction correct?



4. Count by 10s. What numbers come next?

- a. 30 _____
- b. 250 _____
- c. 680 _____



What happens when you start from a number that doesn't end in 0?

If necessary, the student may use the hundred chart to help count by 10s. Remind the student that the pattern remains the same for the numbers greater than 100. There is just an extra digit added.

Take the buttons off your hundred chart. Now count by 10s starting at 3. Put a button on every tenth number.

- 5. What pattern was made? _____
- 6. What digit did each number end with? _____



7. How did the first digit in two-digit numbers change each time?

8. Make a prediction. What pattern would you see if you counted by 10s starting at 6?

9. How could knowing this help you add 10 to a number?

10. Count by 10s. What numbers come next?

a. 18 _____

b. 57 _____

c. 358 _____

d. 727 _____

e. 452 _____



LESSON 2

Can you count by 100s? Remember, the hundreds digit increases by one each time.

- Starting at 100, count by 100s to 1000.

100 _____ 1000

You can use this fact to help you count by 100s from any number.

- Count by 100s. What numbers come next?

- 382 _____
- 139 _____
- 471 _____
- 203 _____

I want to count by 100s from 347.
So I change the hundreds digit each time. The other digits stay the same.

347, 447, 547, 647, 747, 847, 947

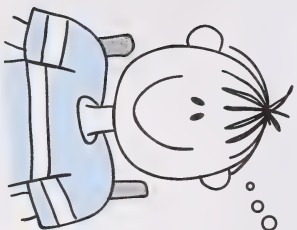


MENTAL MATH

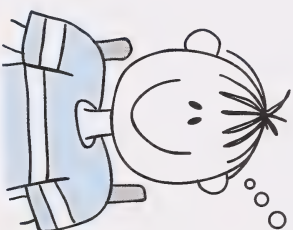
Counting by 2s, 5s, 10s, or 100s is really repeated addition. Remembering the pattern these numbers make on a hundred chart can help you add in your head.

If you count by 2s, it is the same as adding $2 + 2 + 2 + 2 + 2$ as many times as you like.

If you have a question like $38 + 5$, you might think like Luke does.



When I count by 5s, the next number would end in 3 and the tens digit would change to 4. So the answer is 43.



When I count by 10s, the tens digit increases by one. So if I am adding $453 + 10$, the answer is 463.

If you are adding 10 to a number, remember the pattern.



Do the adding questions in your head. Use what you know about skip counting and number patterns to help you.

3. a. $76 + 2 =$ _____ b. $51 + 2 + 2 + 2 =$ _____

c. $455 + 5 =$ _____ d. $949 + 5 =$ _____

e. $5 + 5 + 5 + 5 =$ _____ f. $537 + 10 =$ _____

g. $201 + 10 + 10 =$ _____ h. $345 + 100 =$ _____

i. $598 + 100 + 100 =$ _____ j. $412 + 100 =$ _____



Go to Assignment Booklet 3A. When you have finished today's assignment, find the pages in your Student Folder that need to be sent to your teacher. Remember to complete the Student's Checklist and write your comments about Days 1 to 9.

Complete the Home Instructor Checklist and add any comments you have. A mailing checklist has been included in Assignment Booklet 3A to help you and your student gather the necessary assignments.



DAY 10: CALCULATOR FUN

Calculators can help you skip count and discover number patterns.

Are you ready to have some fun with your calculator?



LESSON 1

You have learned how to use a hundred chart to skip count by different numbers. A calculator can also be useful when you are skip counting.



Take out your calculator.

Follow the directions below to count by 5s on the calculator.

1. Press **5** **+** **=**.

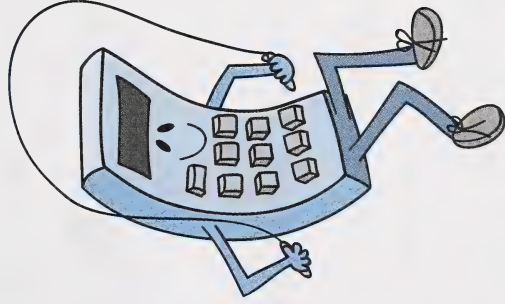
What number do you see? _____

2. Press **=** again.

What number do you see now? _____

3. Press **=** five more times.

What number do you see? _____



Calculators are especially useful when skip counting larger numbers or numbers that are not usually practised (like 3, 6, and 7).

If your student does not have a TI-108 calculator, the functions may be different. To skip count on some calculators, the student must press the number, then

+ each time.



DAY 10

You can start from any number and skip count with the calculator, too. This is how you do it.

- Enter the starting number.
- Press **+**.
- Press the number you want to count by.
- Press **=**.

Try counting by 5s from 347.

4. Press **3** **4** **7** **+** **5** **=**.

What number do you see? _____

5. Press **=**. Write the number you see. Then press **=** three more times, and write the numbers you see each time.

247

252

257

6. Use the calculator to count by 5s. Write the numbers that come next.

a. 738 _____

b. 951 _____

262



c. 497 _____

7. Use the calculator to count by 10s. Write the numbers that come next.

a. 578 _____

b. 793 _____

c. 489 _____

8. Use the calculator to count by 2s. Write the numbers that come next.

a. 567 _____

b. 902 _____

c. 599 _____

LESSON 2

In this activity, you will estimate how much time it will take to count by 2s, 5s, and 10s. Then you will time yourself to find the actual time!

You will need a clock or a watch with a second hand. Your home instructor can help time you.

It may be difficult for your student to watch the clock and work with the calculator. You or another student may wish to do the timing for the student.



DAY 10

Assist if the student requires help with the timing.

You may need to explain that the symbol "... " means to keep going.

Estimate how many seconds it will take to make the calculator count by 1s to 100?

Estimate: _____

Time yourself or ask your home instructor to time you.

Press $\boxed{1}$ $+$ $=$ $=$. . . , and say each number until you reach 100.

Actual: _____

Now, try counting by 2s to 100.

Estimate: _____ Actual: _____

Try counting by 5s to 100. Estimate: _____ Actual: _____

Try counting by 10s to 100. Estimate: _____ Actual: _____

Which was the quickest way to count? _____



Go to Assignment Booklet 3B.



DAY 11: MORE COUNTING PATTERNS

You have practised counting by 2s, 5s, 10s, and 100s. Today, you will use hundred charts and your calculator to find some different number patterns.

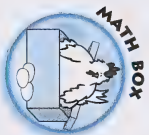


Counting by 3s, 4s, 8s, and 9s helps prepare your student for work with multiplication later this year.

You can use a calculator to count by any number.

- Enter the starting number.
- Press **+**.
- Press the number you want to count by.
- Press **=**.

In the next activities, you will count by different numbers and colour the numbers on a hundred chart.

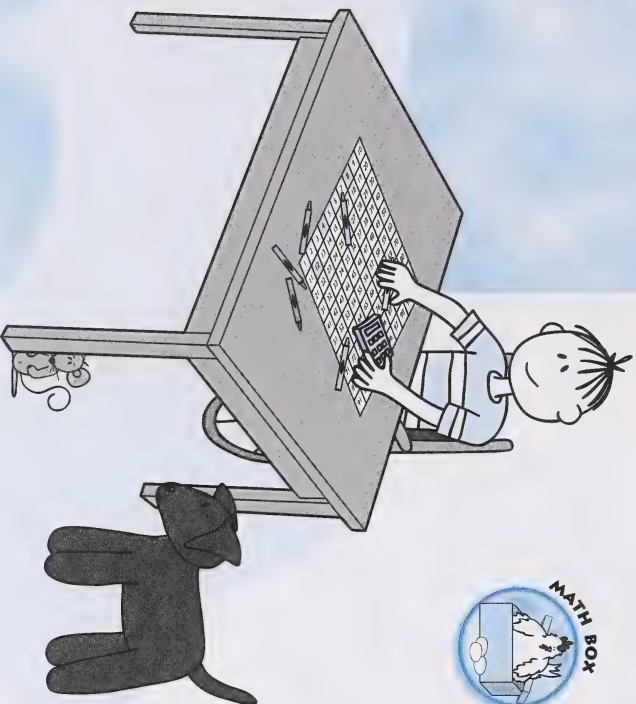


Take out your calculator.

Do you remember how to count by 4s?

Press **4** **+** **4** **=** **=** . . .

1. On the hundred chart on the next page, colour the numbers you see on the calculator as you count.



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

2. What pattern do you see on the hundred chart?

3. Look at the last digit of the numbers you have coloured. When does the last digit start repeating?

Use the calculator to count by 8s. What will you press?

4. On the hundred chart, colour the numbers you see on the calculator.

5. What pattern do you see? _____

6. Look at the last digit of the numbers you have coloured.
When does the last digit start repeating?

7. How is this hundred chart like the one you did when you counted by 4s?

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Are you ready for your timed exercise? Write how many you completed. Ask your home instructor to mark the questions and to write how many were correct. Colour in the number you got correct on your Subtraction Facts Graph.



TIMED EXERCISE: 2 MINUTES

$$12 - 5 = \underline{\hspace{2cm}}$$

$$17 - 8 = \underline{\hspace{2cm}}$$

$$10 - 7 = \underline{\hspace{2cm}}$$

$$13 - 4 = \underline{\hspace{2cm}}$$

$$11 - 4 = \underline{\hspace{2cm}}$$

$$14 - 5 = \underline{\hspace{2cm}}$$

$$16 - 8 = \underline{\hspace{2cm}}$$

$$12 - 6 = \underline{\hspace{2cm}}$$

$$13 - 7 = \underline{\hspace{2cm}}$$

$$\begin{array}{r} 10 \\ - 6 \\ \hline \end{array}$$

$$\begin{array}{r} 11 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ - 5 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ - 9 \\ \hline \end{array}$$

$$\begin{array}{r} 14 \\ - 7 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ - 9 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - 6 \\ \hline \end{array}$$

$$\begin{array}{r} 11 \\ - 3 \\ \hline \end{array}$$



Go to Assignment Booklet 3B.

Number completed	
Number correct	



DAY 12: COUNTING BY 25s

In today's lesson, you will practise counting by 25s.

Have you ever counted quarters to find out how much money you have? Counting by 25s can help you count money or solve word problems.



LESSON 1

You have learned to skip count by many different numbers. Can you skip count by 25s? Hundred charts and calculators can help you skip count.

1. What pattern do you think you would see if you skip counted by 25 on a hundred chart and coloured it in?
-

2. If you counted by 25s past 100, would the number pattern change?
-



Take out your calculator.

Do you remember how to skip count on the calculator?

3. Count by 25s from 25. What number would you press first? _____
4. What keys would you press next? _____ and _____
5. What key would you press next? _____

Your student experienced counting by 25s to 100 in grade two. The student learned to count by 25 starting from multiples of 25 only.

Can the student visualize how this pattern would look without actually doing it? If not, go back to one of the hundred charts from Day 11 and have the student colour in every 25th number. Have the student use a different colour from the one that was used for the Day 11 activity.



6. Use the calculator to count to 500 by 25s. Start at 25. Write the numbers.

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____



7. How do the numbers change with each hundred? _____

8. Count on by 25s from each number.

a. 350	_____	_____	_____	_____	_____
b. 275	_____	_____	_____	_____	_____
c. 725	_____	_____	_____	_____	_____
d. 875	_____	_____	_____	_____	_____



LESSON 2

Do you remember your four problem-solving steps? Use them and what you know about skip counting to solve the following problems. Do the problem-solving steps in your mind. Show your work.



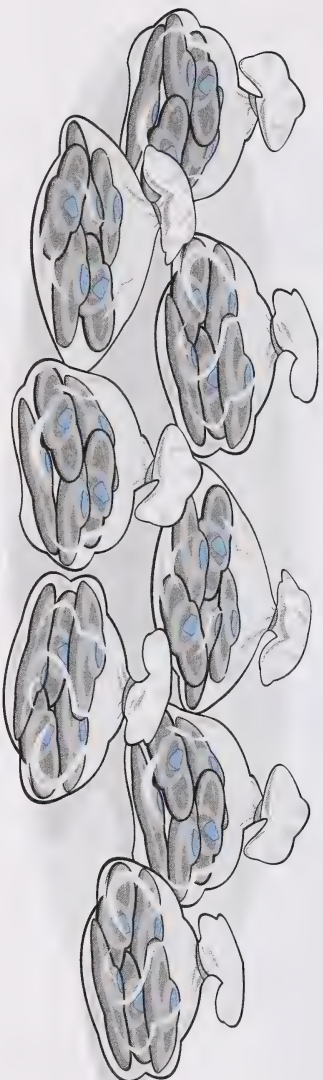
1. Sarah and her dad were baking cookies for a community bake sale. They put 25 cookies on each plate. How many cookies did they make in all if they filled 6 plates?

Sarah and her dad made _____ cookies.



2. Sarah's neighbour, Fiona, made pastries. She put 5 pastries in each bag. How many pastries did she make if she filled 8 bags?

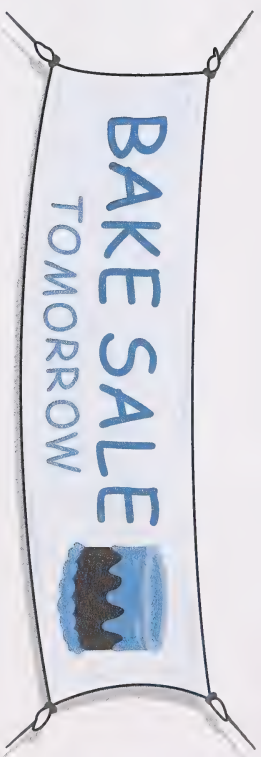
Fiona made _____ pastries.



3. Sarah counted some change for her mom after the bake sale. There were 150 pennies and 6 quarters. How much money in cents was there in all?

There were _____ cents.

Go to Assignment Booklet 3B.



DAY 13: COUNTING BACKWARD

It is useful to know how to count backward. Knowing how to count backward can help you subtract and divide numbers.

Today, you will use number patterns to count backward.



Demonstrate how to start at the bottom of the chart, and read the numbers right to left.

LESSON 1

Have you ever tried counting backward? Count backward by 1s from 100 for your home instructor.

A hundred chart can help you count backward as well as forward. Start at the bottom of the chart and read from right to left.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100





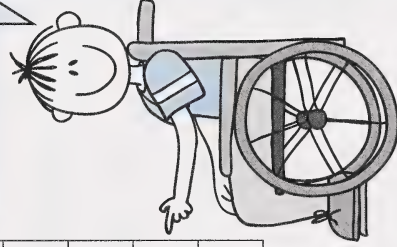
Take out your hundred chart.

Use the hundred chart to help you skip count backward from 100 by 2s. Put your finger on 100. Skip a number, and then point to and say 98. Skip a number, and then point to and say 96.

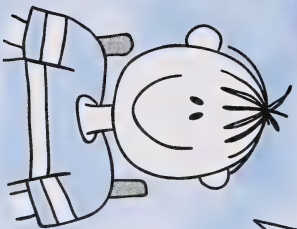
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



100, 98, 96, 94, 92, 90 ...



368, 366, 364, 360, 358 . . .



Some students may have difficulty making the transition to the previous hundred. For example, it may be difficult remembering that 200 is followed by 198 when counting backward by 2s. If necessary, have the student write the numbers in order before and after the hundreds digit, such as 190, 192, 194, 196, 198, 200, 202, 204, 206, 208. The student can then use these numbers to count backward.

1. Count backward by 2s. Write the missing numbers.

a. 70 68 _____

b. 54 52 _____

c. 92 90 _____

d. 38 36 _____

You can use the hundred chart to help you count backward from larger numbers, too. The pattern remains the same, but the hundreds digit is changed.

2. Count backward by 2s. Write the numbers that come next.

a. 564 562 _____

b. 206 204 _____

c. 978 976 _____

d. 720 718 _____



You can use the patterns on a hundred chart to count backward by any number.

Do you remember the pattern made when counting by 5s on the hundred chart?

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

3. Use the chart to count backward by 5s. Write the missing numbers.

- a. 55 50 _____
- b. 90 85 _____
- c. 765 760 _____
- d. 570 565 _____



Do you know number patterns well enough to write them down without using a hundred chart?

4. Count by 10s to 100, and write the numbers.

Now, it is easy to see how the pattern would go when you count backward.

5. Count backward by 10s. Write the missing numbers.

a. 100 90 _____

b. 140 130 _____

c. 650 640 _____

d. 510 500 _____

6. Now try counting by 100s forward. Write the numbers below.



7. Count backward. Write the missing numbers.

a. 800 700 _____

b. 700 600 _____

c. 1000 900 _____

LESSON 2

A calculator can also be used to count backward.



Take out your calculator.

- Enter the starting number.
- Press **-**.
- Press the number you want to count by.
- Press **=**.

Use the calculator to count backward.



1. Count backward by 5s. Write the missing numbers.

a. 615 610 _____

b. 990 985 _____

c. 430 425 _____

2. Count backward by 2s. Write the missing numbers.

a. 710 708 _____

b. 532 530 _____

c. 698 696 _____



Go to Assignment Booklet 3B.

1000

900

800

700

600



DAY 14: RECOGNIZING NUMBER PATTERNS

Sometimes, you need to figure out a pattern before you can tell what comes next.

When you are looking for an address in a city, you have to figure out the pattern of the building numbers before you can find the place you are looking for.

In today's activities, you will think about pattern rules and learn some ways to help you recognize patterns quickly.



Can the student recognize the pattern? Does the student realize that the tens digit increases by one each time? Thus, the numbers here show counting by tens.

Look at the pattern below. What can you tell your home instructor about it?

650 660 670 680 690 700

You could probably see that the tens digits increased each time. You may have said the pattern showed counting by 10s.

1. What clues showed you the counting forward by 10s pattern?

An easy way to tell about a pattern rule is to use math symbols. The numbers in the pattern above increased by 10 each time. You could say that the pattern rule is **+ 10**.

650	660	670
$\begin{array}{r} + 10 \\ \hline \end{array}$	$\begin{array}{r} + 10 \\ \hline \end{array}$	$\begin{array}{r} + 10 \\ \hline \end{array}$
660	670	680

Look at this pattern.

370 360 350 340 330 320

2. Describe the pattern.



You could probably see that the tens digits were getting smaller, so you knew that the pattern showed counting backward by 10s. You could say that the pattern rule is **-10** because the numbers decrease or get smaller by 10 each time.

670	660	650
$\begin{array}{r} -10 \\ \hline \end{array}$	$\begin{array}{r} -10 \\ \hline \end{array}$	$\begin{array}{r} -10 \\ \hline \end{array}$
660	650	640

When you look at a number pattern, think about the following things you have learned:

- When counting by 2s from an even number, the numbers are always even. The digits 0, 2, 4, 6, or 8 are in the ones place.
- When counting by 2s from an odd number, the numbers are always odd. The digits 1, 3, 5, 7, or 9 are in the ones place.
- When counting by 10s, the tens digit will increase or decrease by one each time.



When counting by 100s, the hundreds digit will increase or decrease by one each time.



I look to see if the numbers are increasing or decreasing. Then I check to see which digits are changing. Do the ones, tens, or hundreds digits change?

3. Look at the patterns given. Describe each pattern. Write a pattern rule for each. An example is done for you.

800 700 600 500 400

Description: counting backwards by 100s Rule: -100

a. 130 132 134 136 138

Description: _____ Rule: _____

b. 85 80 75 70 65 60 55

Description: _____ Rule: _____

c. 125 150 175 200 225 250

Description: _____ Rule: _____



d. 87 77 67 57 47 37

Description: _____

Rule: _____

e. 453 553 653 753 853 953

Description: _____

Rule: _____

4. Make up your own number pattern. Then ask your home instructor to guess the rule.

Describe the number pattern the student has created, and guess the pattern rule. If the student has not created a pattern, review some possible choices that could be used to make a pattern.

INTERNET



For extra practice with your subtraction number facts, try these websites:

- <http://www.aaamath.com>
- <http://www.aplusmath.com>

Are you ready for your timed exercise? Ask your home instructor to time you for 2 minutes. Write how many you completed. Ask your home instructor to mark the questions and to write how many were correct. Colour in the number you got correct on your Subtraction Facts Graph.

TIMED EXERCISE: 2 MINUTES

$$12 - 7 = \underline{\quad}$$

$$16 - 9 = \underline{\quad}$$

$$17 - 9 = \underline{\quad}$$

$$10 - 3 = \underline{\quad}$$

$$13 - 5 = \underline{\quad}$$

$$15 - 6 = \underline{\quad}$$

$$11 - 8 = \underline{\quad}$$

$$14 - 7 = \underline{\quad}$$

$$16 - 7 = \underline{\quad}$$

$$18 - 8 = \underline{\quad}$$

$$12 - 5 = \underline{\quad}$$

$$13 - 6 = \underline{\quad}$$

$$\begin{array}{r} 10 \\ - 5 \\ \hline \end{array}$$

$$\begin{array}{r} 11 \\ - 7 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - 5 \\ \hline \end{array}$$

$$\begin{array}{r} 11 \\ - 7 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 14 \\ - 6 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - 9 \\ \hline \end{array}$$

$$\begin{array}{r} 11 \\ - 2 \\ \hline \end{array}$$

$$\begin{array}{r} 14 \\ - 6 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - 9 \\ \hline \end{array}$$

$$\begin{array}{r} 11 \\ - 2 \\ \hline \end{array}$$



Go to Assignment Booklet 3A.



Number completed	
Number correct	

DAY 15: EXTENDING NUMBER PATTERNS

You often have to extend a pattern to find an answer to a problem. If you understand the pattern and the pattern rule, it is easy to extend a number pattern.

Today, you will extend some patterns and solve some word problems.



If your student doesn't remember how to write a pattern rule, refer to Day 14.

LESSON 1

In yesterday's lessons, you discovered patterns and described them. You can also use the pattern rule to extend or carry on the pattern.

Look at the numbers below and think of the pattern.

60 55 50 45 40

1. Describe the pattern. _____
2. Write a pattern rule. _____

To extend the pattern, you can continue counting backward by 5s or subtract 5 from each number. You can use a hundred chart or a calculator if you need to.

3. Extend the pattern.

60 55 50 45 40 _____

4. Make up a rule for each number pattern. Then extend the pattern.

a. Rule: _____

150 160 170 180 _____



b. Rule: _____

600 625 650 675 _____

c. Rule: _____

876 874 872 870 _____

d. Rule: _____

845 745 645 545 _____

e. Rule: _____

457 467 477 487 _____

f. Rule: _____

208 213 218 223 _____

If the student does not readily recognize the patterns, ask questions like the following:

- Are the numbers getting larger or smaller?
- How much does each number increase or decrease by?
- Which digit changes each time?



LESSON 2

Recognizing a pattern can help you solve problems.

1. Luke's class visited a licence-plate factory. Luke watched as the licence plates were stamped.



If the pattern continues, what numbers will the next three licence plates be?

Understand
the
problem.

- a. What do you have to find out? _____

- b. How could you solve this problem? _____

Make
a
plan.



c. What is the pattern rule? _____

Solve the problem. Show how you can extend the pattern.

d. Write a sentence to answer the question in the problem.

e. Reread the problem. Does your sentence answer the question that is asked in the problem?

Does the answer make sense? _____

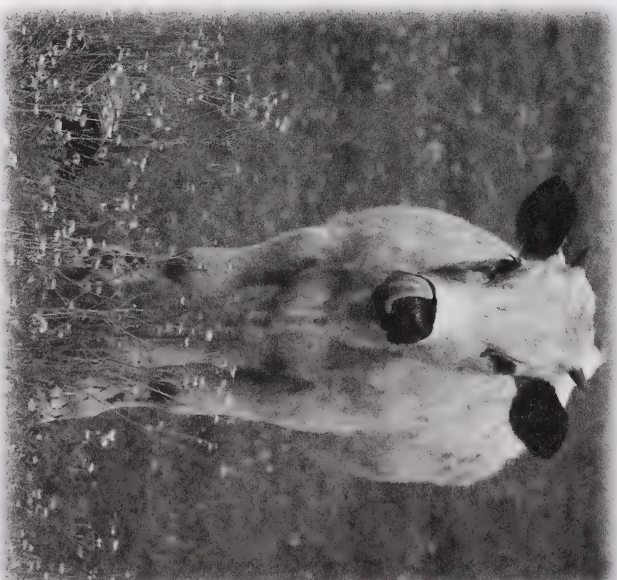
Sometimes, the pattern you need to extend appears in a chart. You may need to add to the chart to continue the pattern.



2. Sarah belongs to the 4-H Beef Club. She is raising a calf. She has to keep a chart of her calf's weight.

Month	Weight (kilograms)
October	250
November	275
December	300
January	325

If the pattern continues, how much will her calf weigh in April?



Understand the problem.

Make a plan.

- a. What do you have to find out? _____
- b. How could you solve this problem? _____





c. What is the pattern rule? _____

Extend the chart and the pattern.

Month	Weight (kilograms)
October	250
November	275
December	300
January	325
February	
March	
April	

d. Write a sentence to answer the question in the problem.

Look
back.

e. Reread the problem. Does your sentence answer the question that is asked in the problem?

Does the answer make sense? _____



Go to Assignment Booklet 3B.



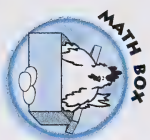
DAY 16: ADDITION PATTERNS

You have learned about many different types of patterns. Did you know that patterns are formed when you add too?

Today, you will make some discoveries about adding even and odd numbers.

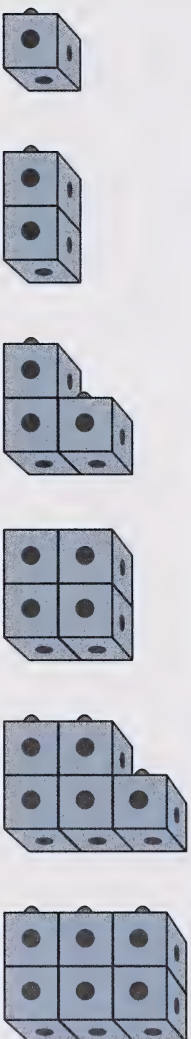


Using blocks will help your student visualize even and odd numbers and draw conclusions about adding numbers.



Take out your interlocking cubes. If you don't have interlocking cubes, use your block cutouts from Day 6.

Use your cubes to make this pattern.



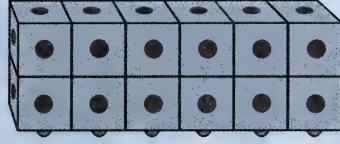
1. What do you notice about the pattern? _____

2. What shape does an even number of blocks make? _____

3. What shape does an odd number of blocks make? _____



4. Extend the pattern 4 more times. Draw the block shapes in the space provided.



5. Do you think the pattern would change if you made the numbers all the way to 500? _____

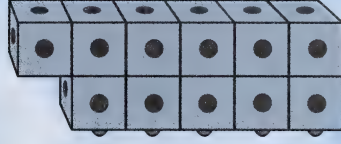
6. Think about the numbers below. If you used the same block pattern, would they have even or uneven tops?

- a. 67 _____
- b. 84 _____
- c. 191 _____
- d. 770 _____
- e. 1000 _____
- f. 975 _____

You have probably discovered that all even numbers would have an even or flat top with this block pattern. All odd numbers have an uneven top.

Now think about adding even numbers.

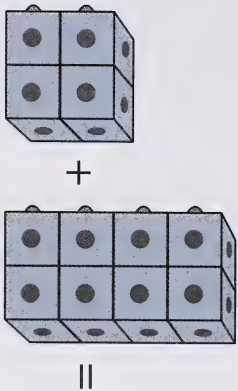
What do you think will happen when you add two **even** numbers? Will the answer be even or odd? Will the block tops be even or uneven? Tell your home instructor.



Have your student predict whether the answer will be even or odd when you add two even numbers.

You can find out by adding two even numbers. Make the block tower for the adding questions below.

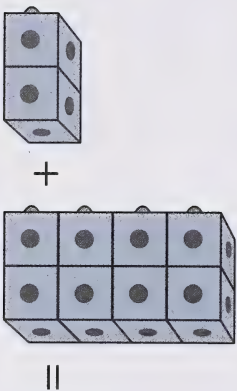
7.



a. $4 + 8 =$ _____

b. Is the answer even or odd? _____

8.



a. $2 + 8 =$ _____

b. Is the answer even or odd? _____



9. Choose any two even numbers, and add them.

a. _____ + _____ = _____

b. Was your answer even or odd? _____

10. What have you discovered about adding two even numbers?

11. Make a guess. What kind of number will you get when you add two **odd** numbers?

12. Prove your prediction by thinking of some odd numbers and adding them. You can use blocks to make the pattern if you like. Write at least five examples below.

Encourage your student to make a guess. Explain that it is just a guess and that it is okay to be wrong.



13. What did you discover? _____

14. Make a guess. What kind of number will you get when you add an even number to an odd number?

15. Prove your prediction by adding some even and odd numbers. You can use blocks to make the pattern if you like. Write at least five examples below.

16. What did you discover? _____



Go to Assignment Booklet 3B.



GRADE THREE MATHEMATICS

DAY 17: PROBLEM SOLVING

You can solve many different kinds of problems when you know how to find patterns and extend them.

Are you ready to solve some word problems? You will also try making up some pattern problems of your own today.



If your student has difficulty with problem solving, you may wish to review the problem-solving strategies introduced in earlier lessons. Check Module 1: Days 4, 8, and 10; Module 2: Days 7, 11, 13, and 17; and Module 3: Days 6 and 15.

You have learned many strategies to help you solve problems. You know how to use the four problem-solving steps and how to look for important words. You have learned that some problems take more than one step to solve.

Some other problem-solving strategies that have been discussed are as follows:

- acting out a problem
- drawing a picture or diagram
- making an organized list or chart
- finding a pattern and extending it

Use your favourite strategies to solve today's problems.

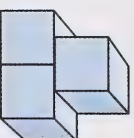
1.

Luke is building a block tower. Look at the steps below. How many blocks will Luke need to continue the pattern and build step 4?

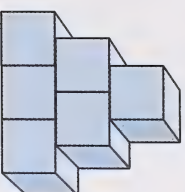
Step 1



Step 2



Step 3



Step 4

?

Understand
the
problem.

a. What do you have to find out? _____

Make
a
plan.

b. How could you solve this problem? _____

Try
the
plan.

c. Solve the problem. Show your work.

d. Write a sentence to answer the question in the problem.

Encourage the student to think of a strategy to solve the problem.



Look back.

- e. Reread the problem. Does your sentence answer the question that is asked in the problem?
- Does the answer make sense? _____

2. Sarah's mom was stencilling a pattern around the kitchen. The pattern looked like this.



She stencilled 50 hearts. How many flowers did she stencil?

Understand the problem.

- a. What do you have to find out? _____

- b. How could you solve this problem? _____

Make a plan.

- c. Solve the problem. Show your work.



- d. Write a sentence to answer the questions in the problem.

- e. Reread the problem. Does your sentence answer the question in the problem?

Does the answer make sense? _____



Luke's friend Ahmad was skip counting.



175, 200, 225, 250 ...

3. What are the next three numbers?

Understand
the
problem.

a. What do you have to find out? _____

Make
a
plan.

b. How could you solve this problem? _____



- c. Solve the problem. Show your work.



- d. Write a sentence to answer the question in the problem.

- e. Reread the problem. Does your sentence answer the question asked in the problem?

Does the answer make sense? _____



If your student has difficulty thinking of a problem, discuss pattern situations you may have encountered or use one of the problems from this lesson as a model.

Make up your own problem about patterns. The problem could be about a pattern you have found, an imaginary pattern, or a number pattern.

4. Write your problem.

Ask your home instructor to solve it.



Go to Assignment Booklet 3B.

DAY 18: LOOKING BACK

Today, you will show your teacher what you have learned about patterns by completing some review questions in Assignment Booklet 3B. You may want to look back through your Student Module Booklet if you have difficulty with any of the questions.

You will also do a timed exercise to send to your teacher. When you finish your assignment, turn to the Module Summary to see what Luke wrote to Sarah.

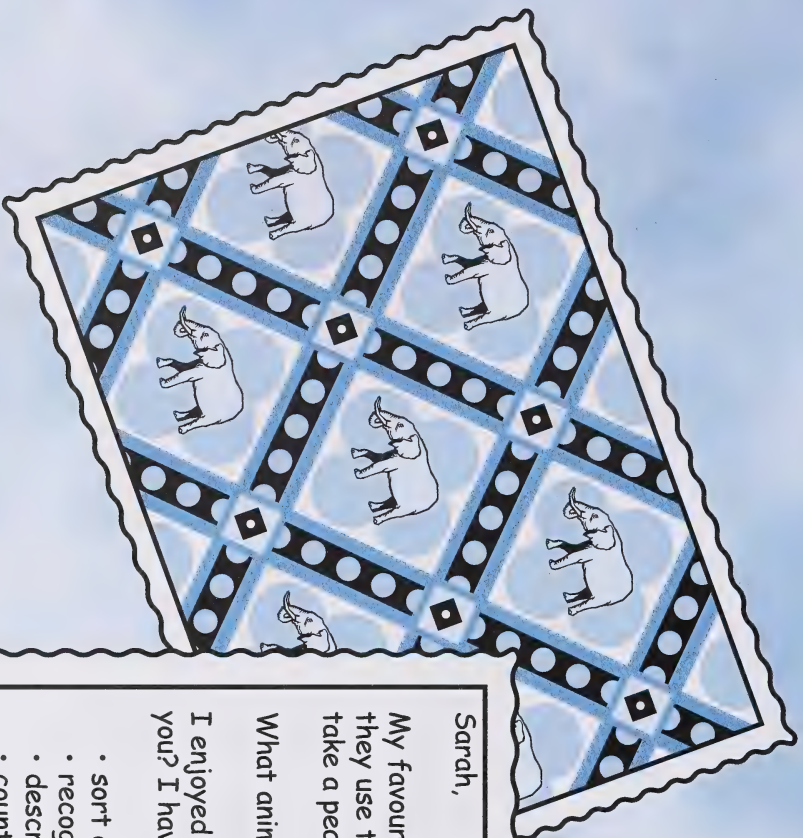


Go to Assignment Booklet 3B. When you have finished today's assignment, fill out the Student's Checklist and write your comments about the module.



SUMMARY

Luke was excited about writing back to Sarah. He couldn't wait to tell her his news.



Sarah,

My favourite animals at the zoo are the elephants too! I like how they use their trunk to pick things up. It feels funny when they take a peanut from your hand. African elephants are really big.

What animals do you have on your farm?

I enjoyed doing Module 3 called "Patterns Everywhere." How about you? I have learned to

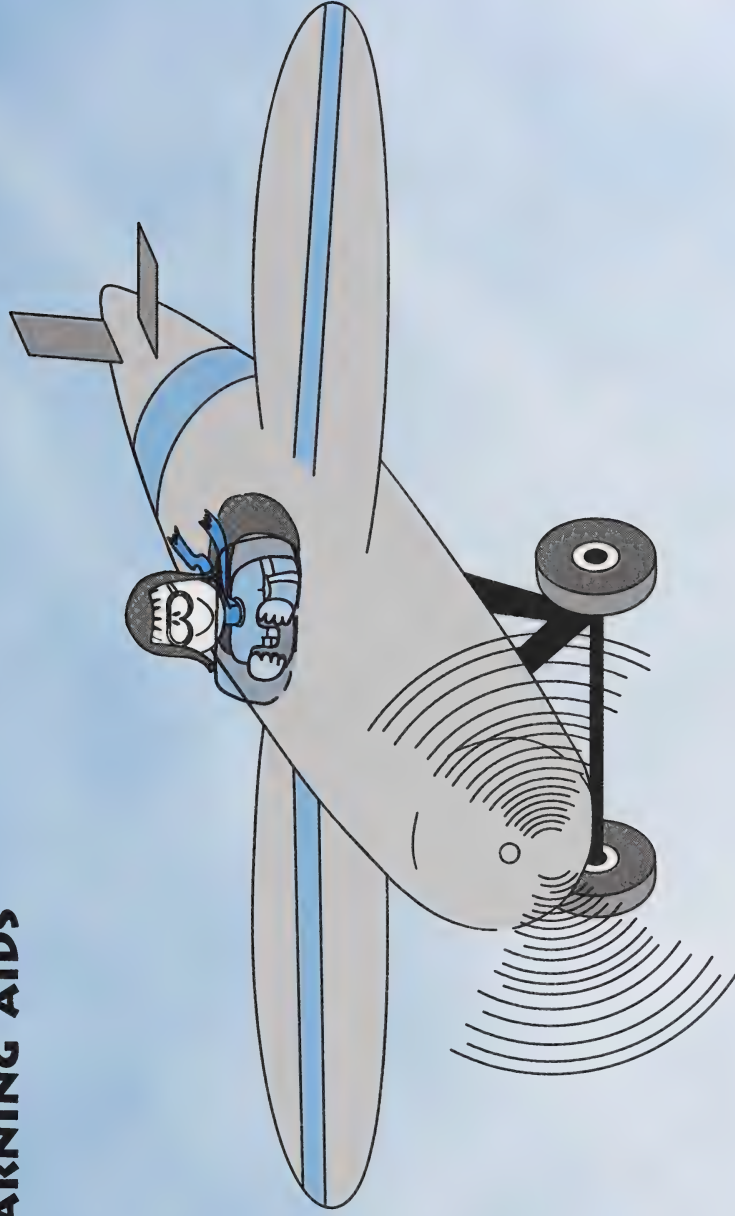
- sort and make sorting rules
- recognize linear, two-dimensional, and number patterns
- describe and extend patterns
- count forward and backward by 2s, 5s, 10s, 25s, and 100s
- solve problems by extending a pattern

Your cousin,
Luke

P.S. Check out my pattern!

APPENDIX

GLOSSARY
IMAGE CREDITS
CUT-OUT LEARNING AIDS



GLOSSARY

column: grid spaces going up and down

diagonal: slanted from corner to corner

horizontal: across, left to right, or right to left

linear: in a line or row

pattern: any arrangement of shapes, colours, numbers, and so on that keeps repeating

row: grid spaces going across

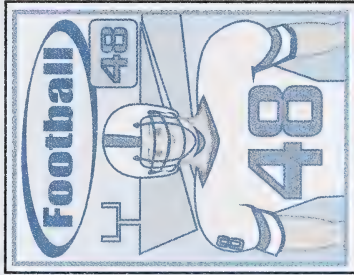
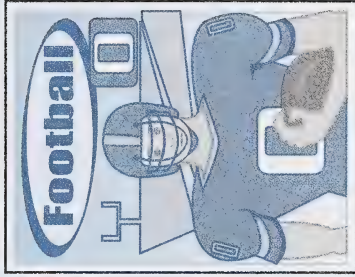
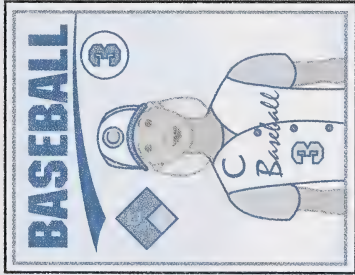
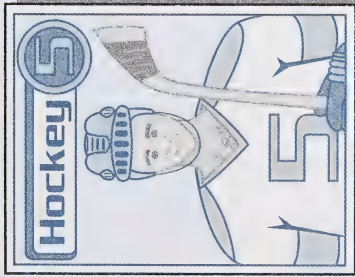
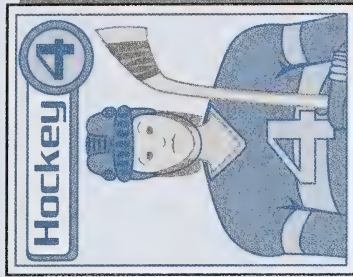
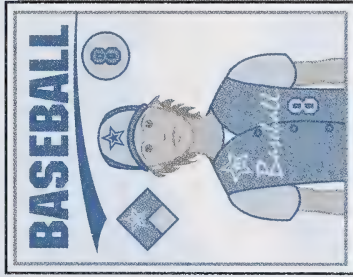
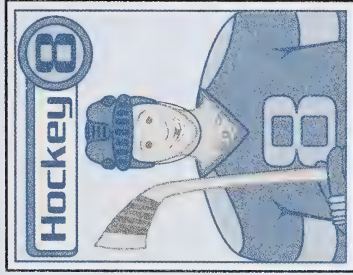
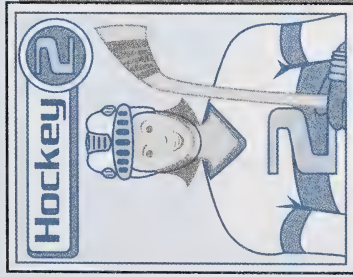
two-dimensional pattern: a pattern that has both length and width

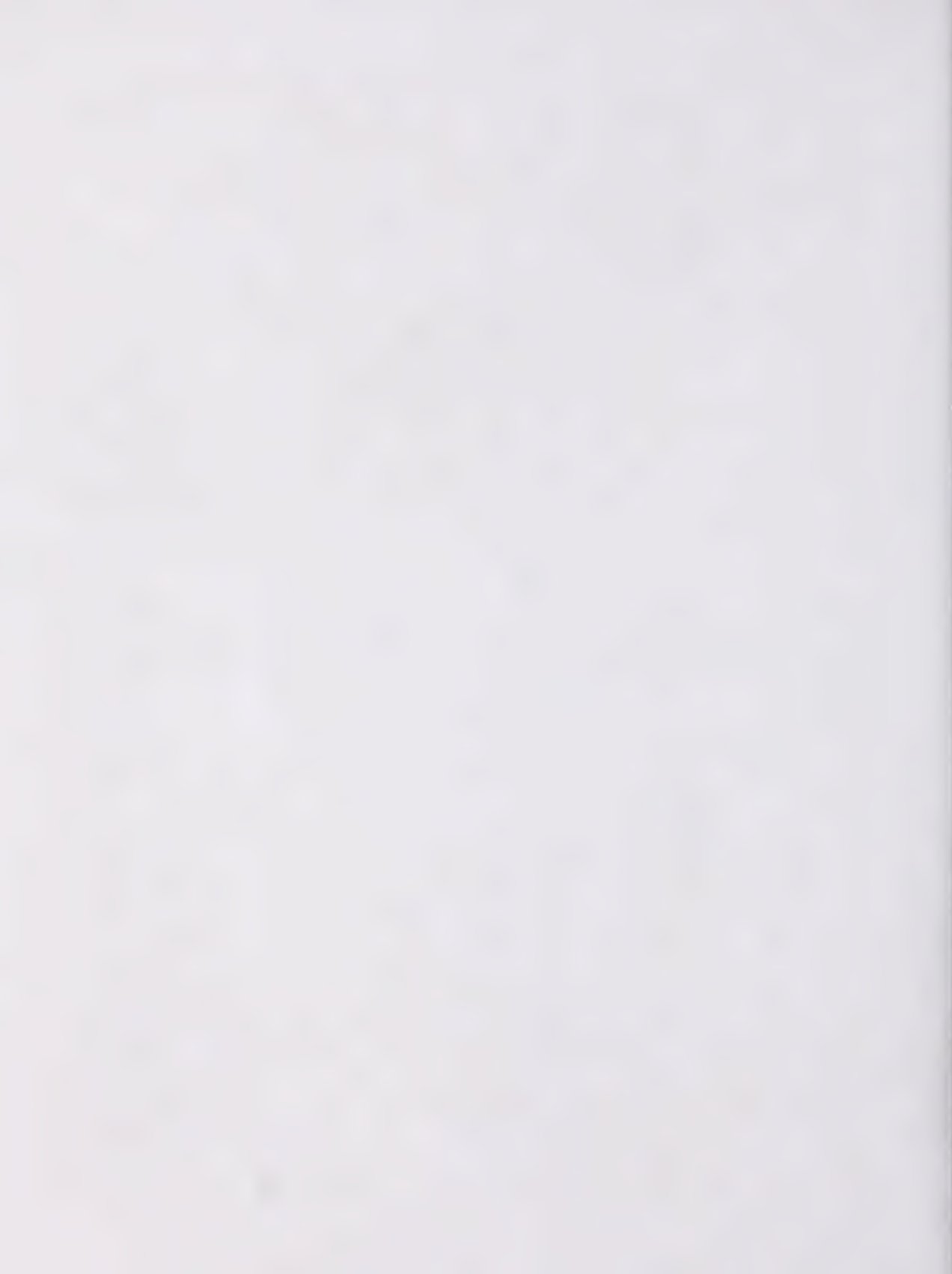
vertical: up and down

IMAGE CREDITS

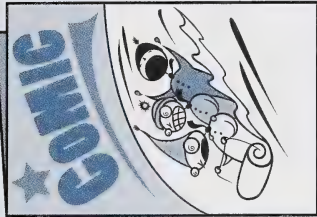





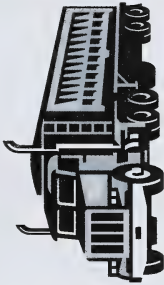


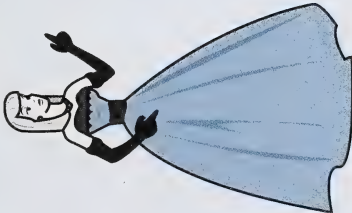



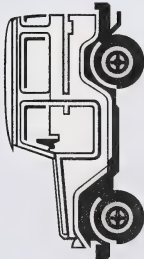

PAGE

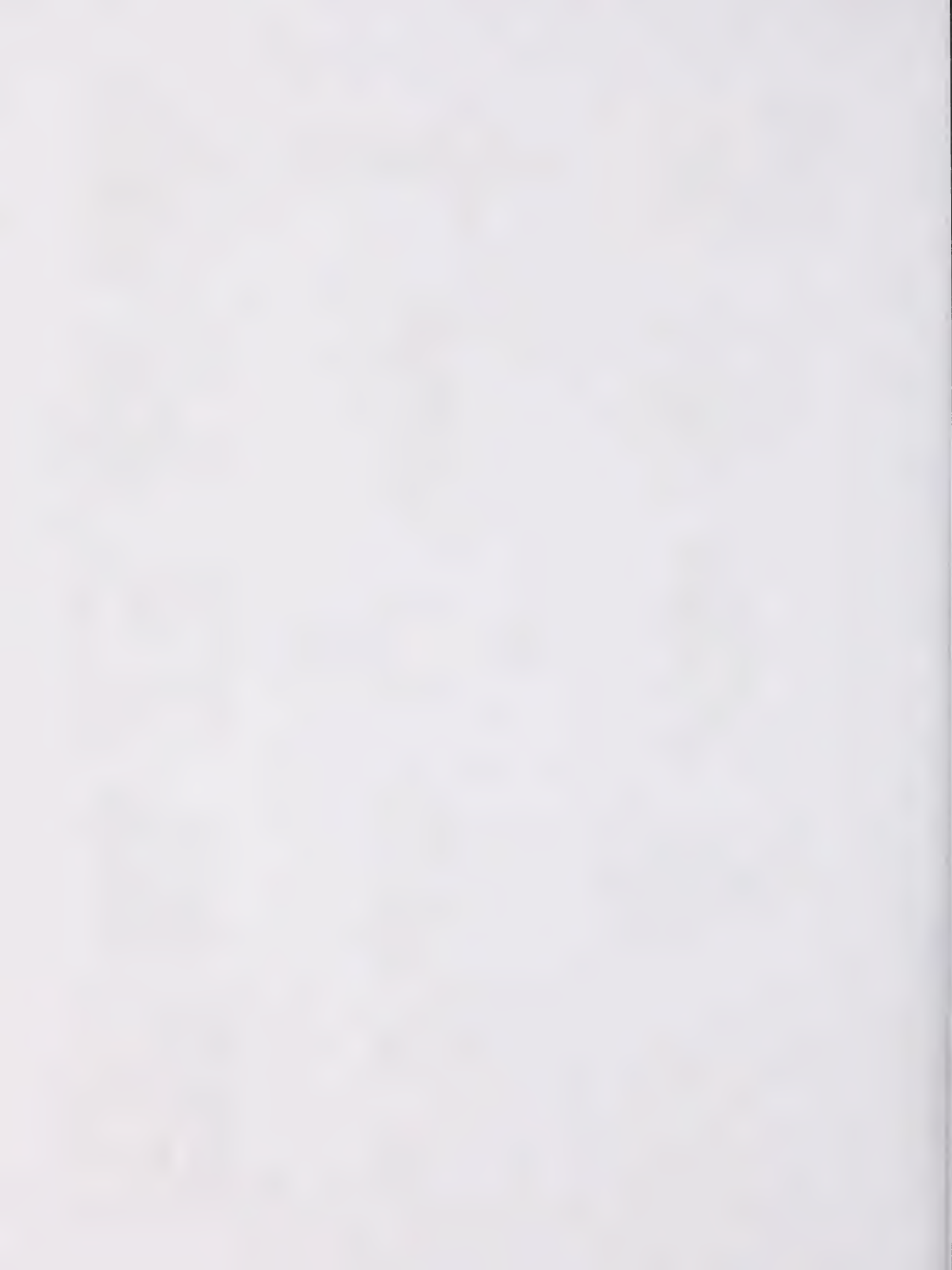
1	Corel Corporation
3	EyeWire Collection/Getty Images
14	RubberBall Productions/Getty Images
16	RubberBall Productions/Getty Images
24	PhotoDisc Collection/Getty Images
26	© 2001-2002 www.arttoday.com
33	PhotoDisc Collection/Getty Images
39	PhotoDisc Collection/Getty Images
40	top: Image Club Artroom/EyeWire Collection/Getty Images
	middle right: RubberBall Productions/Getty Images
45	PhotoDisc Collection/Getty Images
58	RubberBall Productions/Getty Images
61	RubberBall Productions/Getty Images
63	RubberBall Productions/Getty Images
65	RubberBall Productions/Getty Images
93	PhotoDisc Collection/Getty Images
94	RubberBall Productions/Getty Images
97	PhotoDisc Collection/Getty Images
102	PhotoDisc Collection/Getty Images
105	EyeWire Collection/Getty Images
116	PhotoDisc Collection/Getty Images
119	RubberBall Productions/Getty Images




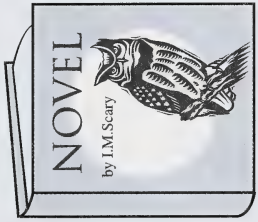

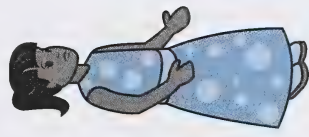
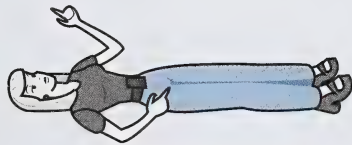




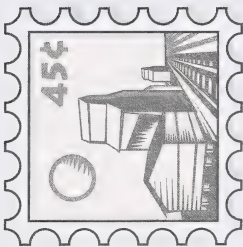





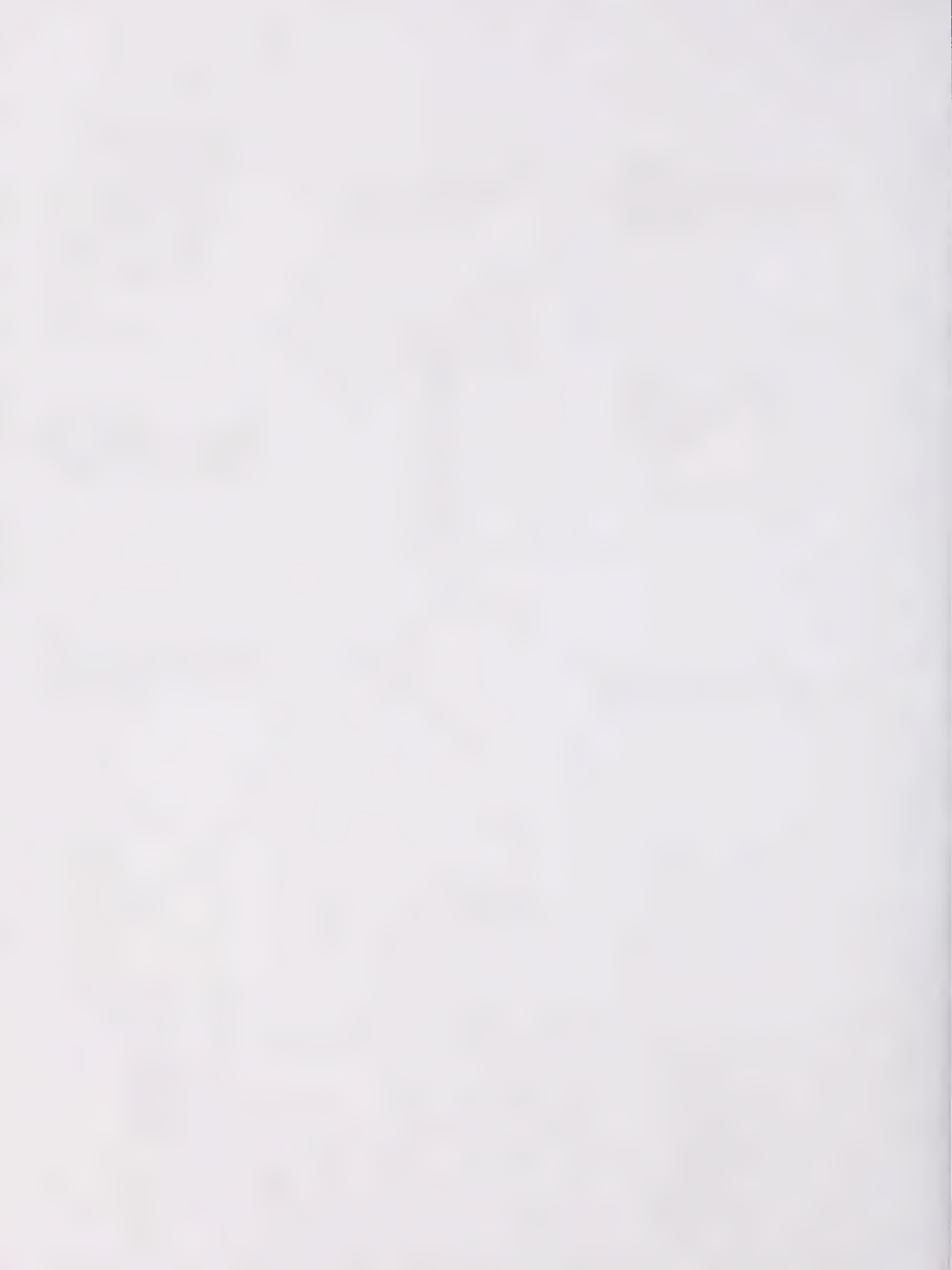








TRIANGLE GRID



BLOCK CUTOUTS

Colour each row and cut out each block.

Colour this row red.

[illegible]

Colour this row blue.

[illegible]

Colour this row yellow.

[illegible]

Colour this row green.

[illegible]

BLOCK CUTOUTS

BLOCK CUTOUTS

BLOCK CUTOUTS

BLOCK CUTOUTS

BLOCK CUTOUTS

BLOCK CUTOUTS

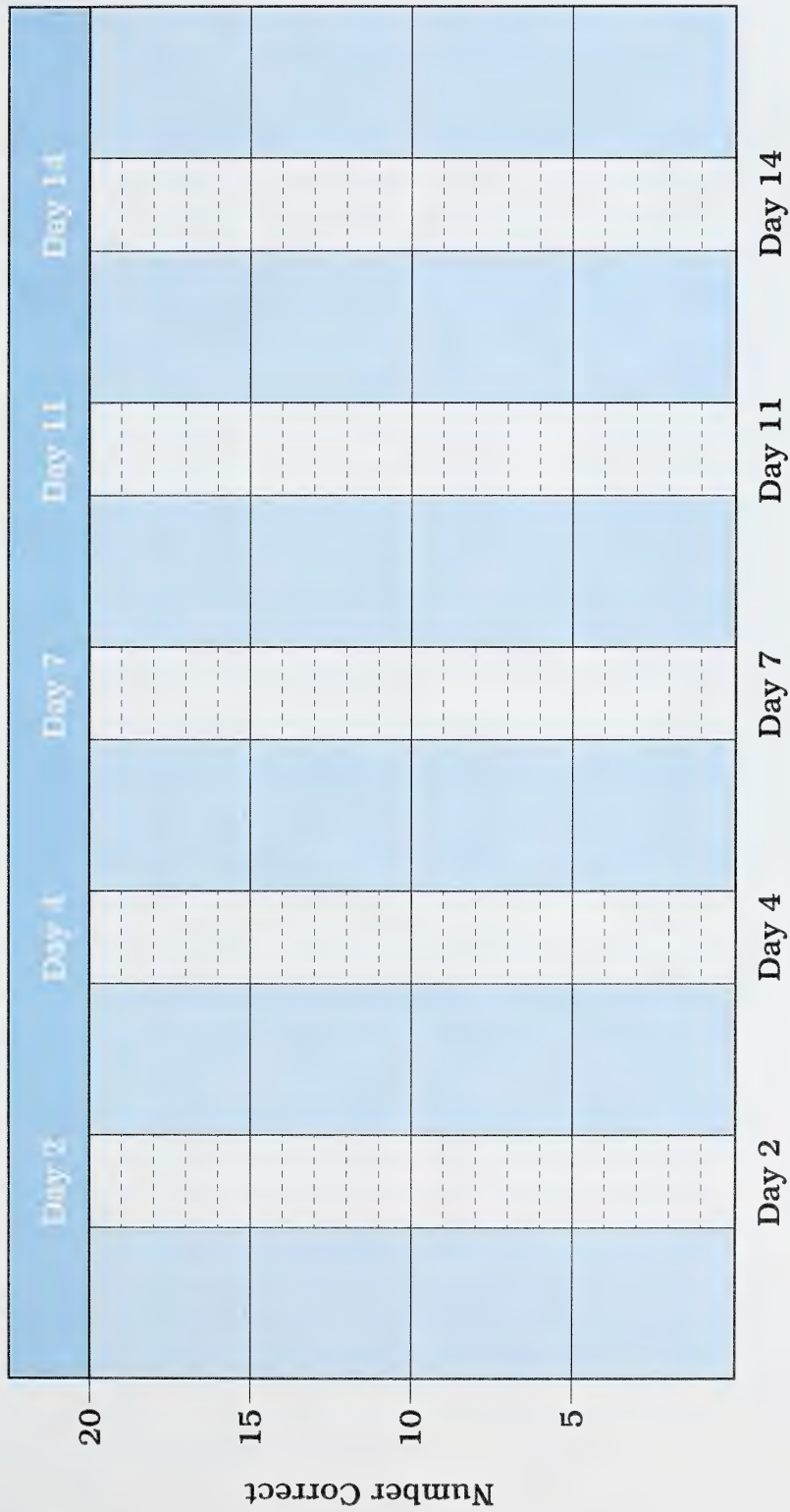
BLOCK CUTOUTS

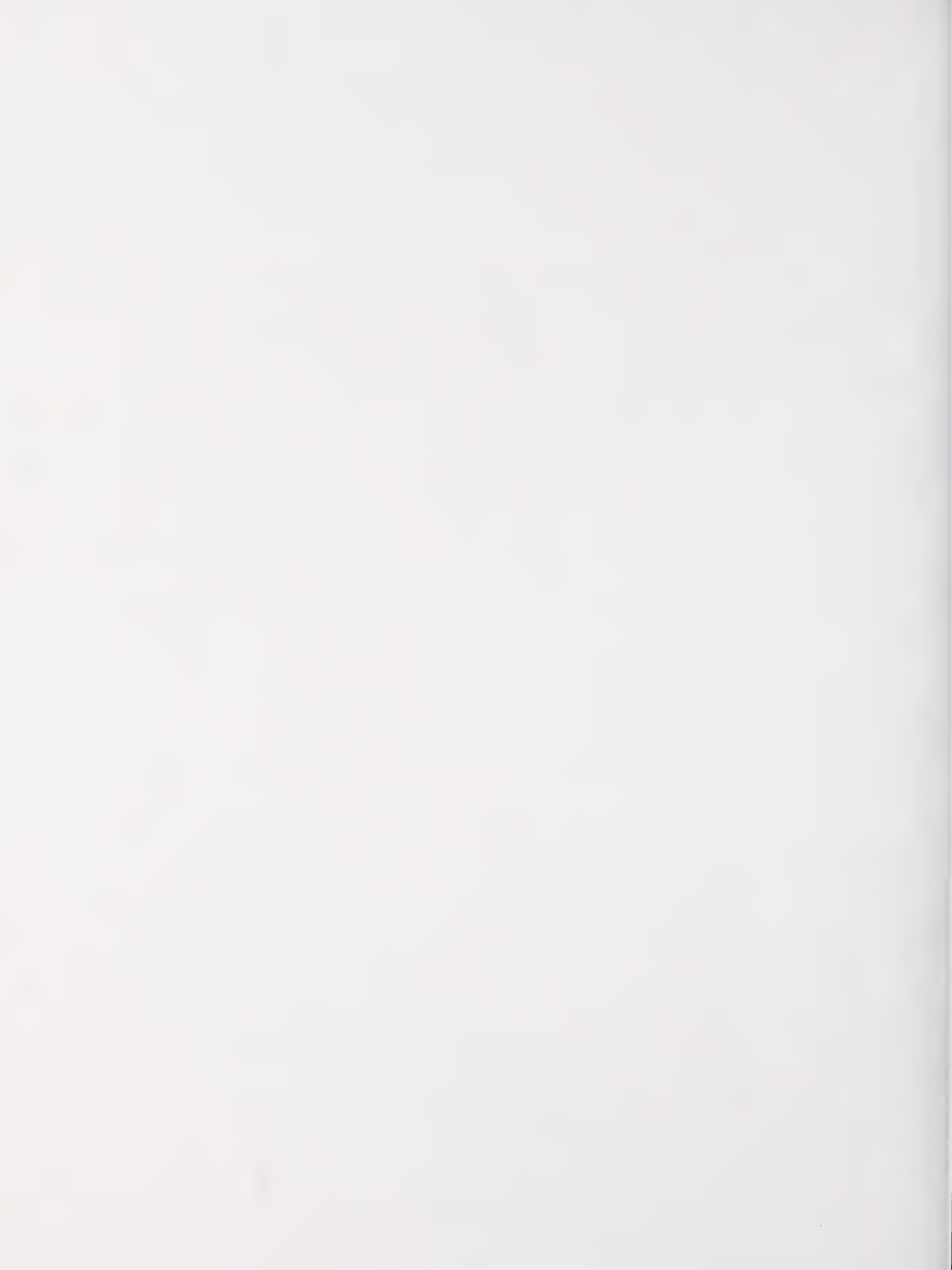
BLOCK CUTOUTS

BLOCK CUTOUTS

BLOCK CUTOUTS

SUBTRACTION FACTS GRAPH





HUNDRED CHART

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

